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A BRIEF SURVEY OF MADRAS LIVE-STOCK

BY

H. C. SAMPSON,

Deputy Director of Agriculture, V and VII Circles.

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PREFACE.

This bulletin is substantially a reprint of the report prepared by Mr. H. C. Sampson in 1912 after spending some eight months on a general survey of live-stock in Madras. This report, which was printed in G.O. No. 1007, Revenue, dated 3rd April 1914, has formed the basis of the action since taken by Government and the Agricultural Department towards the improvement of cattle and live-stock generally in the Madras Presidency. As copies of the Government Order are becoming scarce and as Mr. Sampson's report contains much valuable information of permanent interest, it has been thought advisable to republish it as a bulletin. Some portions of the original report which were of ephemeral interest have been omitted.

It must be remembered that the time allotted to Mr. Sampson, some eight months, was all too short for a thorough investigation into so large a field and that all that was attempted was a rough survey of the then existing conditions.

MADRAS,
4th September 1917.

G. A. D. STUART,
Director of Agriculture.

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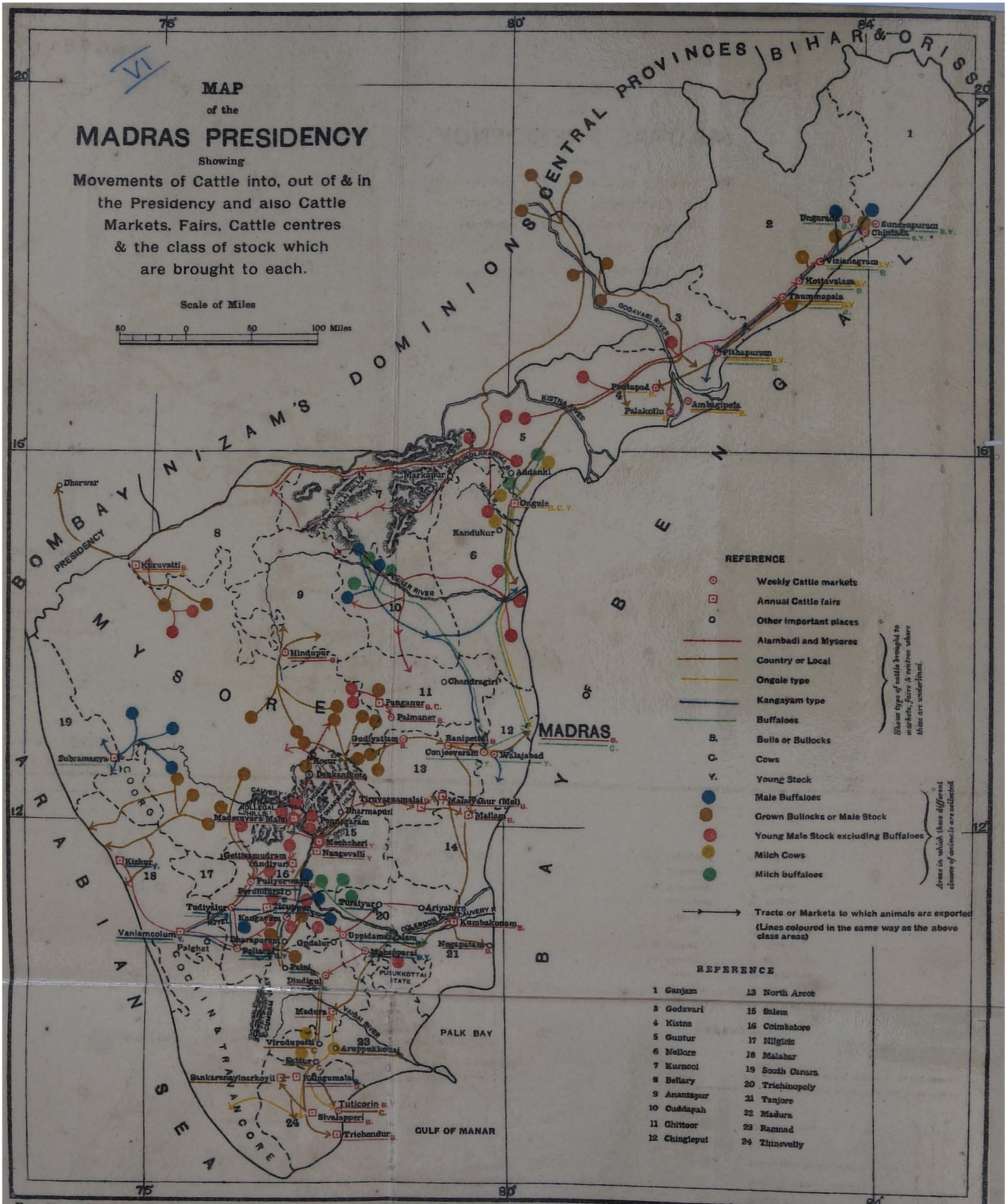

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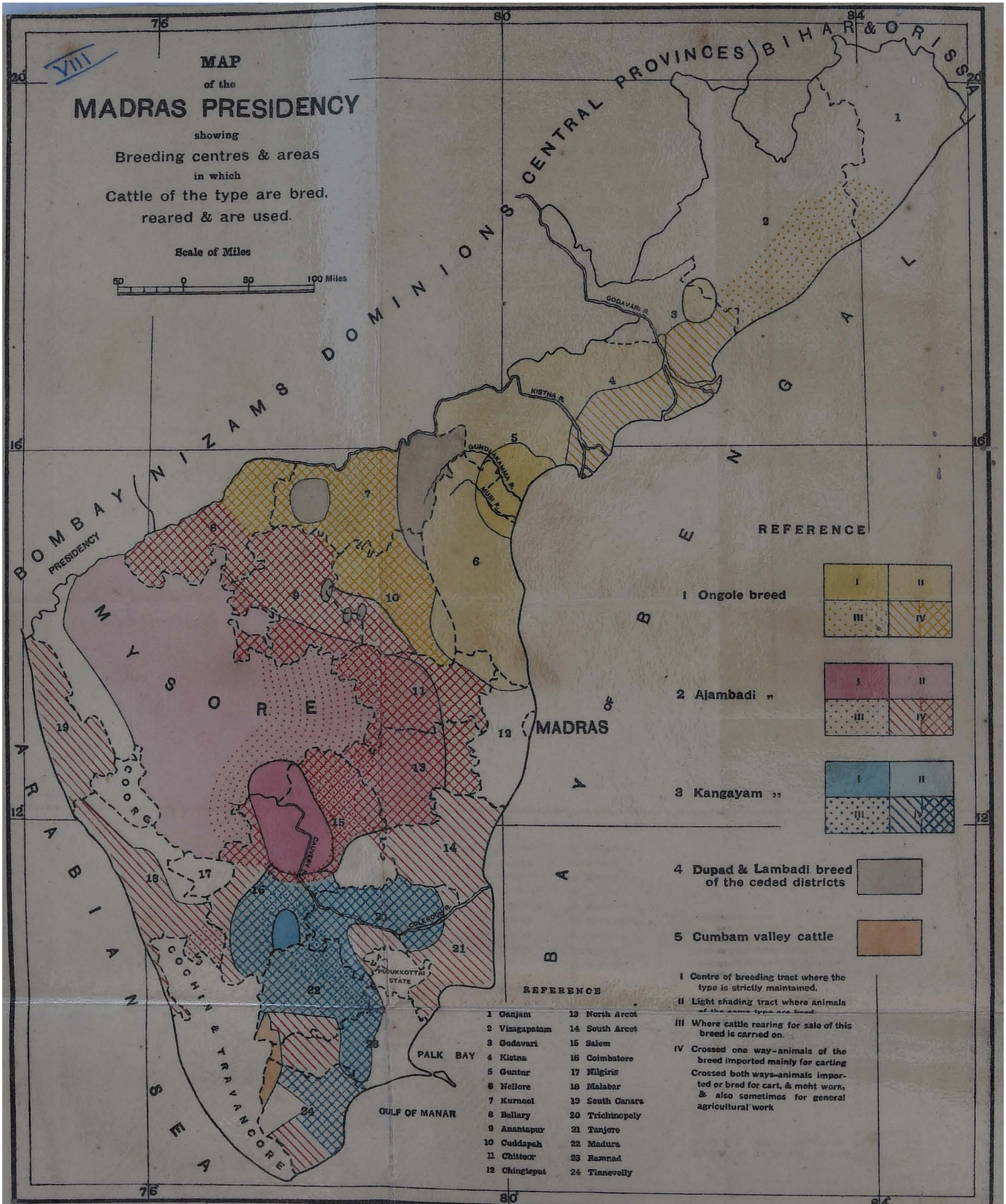

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A BRIEF SURVEY OF MADRAS LIVE-STOCK.

I.—INTRODUCTION.

The question of the improvement of the indigenous breeds of cattle has been before the Government for many years, but as far as Madras is concerned, very little has been done in the past, except from a veterinary point of view.

The question seems to have been first alluded to in 1863, when Sir William Denison issued a minute on the subject. In 1886 the Madras Government, in their Order No. 1112, Revenue, dated the 21st December 1886, approved of the proposals of the Board of Revenue and the Director of Agriculture to institute a cattle survey of the Presidency. This was based on a preliminary enquiry, made by the Director of Agriculture, on the question of how far the fodder supply of the country was responsible for the deterioration of indigenous breeds of cattle, and this is summarized as an enclosure to the Government order above referred to. No records have been kept, however, of the main enquiry, which consisted of the talukwar replies to a series of questions received from Collectors. The only record of this enquiry is Bulletin No. 8 of the Madras Agricultural Department printed in 1890 and consists of the report drawn up by the Assistant Director of Agriculture and the Inspector of Cattle Diseases, who were requested to visit and report on the principal cattle fairs and cattle-breeding centres of the Presidency. Bulletin No. 6 of the Madras Agricultural Department, printed in 1889, which gives the result of the analyses of the several South Indian fodders, is probably also an outcome of this enquiry. The only definite conclusion obtained from the preliminary enquiry was "that the inferior cattle, to be found so generally throughout the Presidency, are the result of the employment of bad sires and of breeding in and from immature animals." Attention was also drawn to the inferiority of cattle, which are habitually fed on paddy straw, but, as pointed out by the then Board of Revenue, the inferiority of such animals is probably due more to the conditions under which agriculture is carried on than to the quality of the fodder. In 1886 a Government stock depot was opened near Hosur with the object of supplying breeding bulls to the country. These were not to be bred there, but were to be purchased from breeders and distributed as required. This was, however, closed down in 1888 after little more than a year's work, and the stock dispersed. This stock included the dairy bulls which had been bred at the Saidapet farm by the Agricultural department and which had been sent here with a view to distribution for the improvement of dairy cows.

In 1901, Lieutenant Holmes, the Superintendent of the Madras Civil Veterinary Department, gave a detailed description of the several recognized Madras breeds of cattle, with measurements of typical

animals of each breed. This was published as Bulletin No. 44 of the Madras Agricultural Department. This was followed in 1909 by Bulletin No. 60 "The cattle of Southern India by Lieutenant-Colonel Gunn, Superintendent, Madras Civil Veterinary Department."

Agricultural shows were started in the fifties, but with very little results, and efforts were again made in 1905 to revive both agricultural and the cattle shows with the aid of Agricultural Associations and similar bodies. Of these only two of any importance now survive, viz., those held at Ongole and Tiruppur. These shows were, and are, assisted by Government grants. With the advent of these latter cattle shows, the Civil Veterinary Department have purchased a few breeding bulls of which there are now seventeen on the rolls. Of these one has been ordered to be sold as no longer useful, eleven are Ongoles, three are Kangayams and the remaining two are 'Mysores.'

The present report is a general cattle survey of the Presidency. Matters of a technical nature have been withheld as far as possible, but, where necessary, reference has been given to previous publications on the subject. In the course of the enquiry, most of the principal breeding tracts, cattle fairs and markets have been visited, and district officers and officers of the Civil Veterinary Department have, where possible, been consulted. Where cattle fairs could not be personally attended, subordinate officers of the Agricultural Department were deputed to report on these on lines of enquiry which had previously been intimated to them.

II.—CONDITIONS OF FARMING IN MADRAS AND HOW THEY AFFECT THE CLASS OF WORKING CATTLE REQUIRED.

Madras is a country of very varying agricultural conditions and hence can make use of any class of working cattle produced.

Excepting the West Coast, the Nilgiris and Ganjām there is hardly a district, where all the main agricultural conditions are not represented, viz., black cotton soil, red or light soils, well irrigation and wet land.

The black cotton soils require heavy cattle to work them. Crops are not so precarious here as on lighter soils and usually black soil ryots keep excellent cattle and look after them very carefully—often extravagantly so. Red and lighter soils require hardy, quick moving cattle. Such soils are not so retentive of moisture as black soils and hence sowing has to be done as rapidly as possible and the crops, even when they have come up, are always liable to fail. Ryots consequently are not so well off and hence cattle on lighter soils are usually of much poorer quality than those on black cotton soils and are not so well cared for. It is, however, becoming increasingly common for ryots on light soils to buy good young stock and rear them carefully. These can be put to light agricultural work when quite young, and are sold, when broken in and trained for work, when they have from two to three pairs of teeth, or sooner, if the seasons are adverse.

Cultivation under wells, where bullock power is used for lifting water, requires medium sized, strong, well built bullocks. If the

wells are very deep (as in Coimbatore) or the buckets are very large (as in the Ceded Districts) similar animals to the black soil cattle are used. Wet land cultivation—especially in the large irrigated tracts —utilizes, what might be termed, the dregs of the cattle market; either light buffaloes or light cattle, which will not sink too deep into the puddled soil, and which are not much loss if they cannot survive the unhealthy conditions, under which they have to work, and the sudden heavy strain put on them to get the land prepared in due season. Buffaloes are not so much in demand in the large deltas as cattle, since there is greater loss among these when they have to be sent away for grazing when the whole country is under water, during the crop season.

III.—CONDITIONS OF CLIMATE, RAINFALL AND SOIL, AS AFFECTING CATTLE-BREEDING, CATTLE AND LIVE-STOCK.

The climate of the Presidency varies greatly in different localities, and has a considerable influence on cattle and live-stock. In the markets of Coimbatore, the "Malai-madu" (the name generally applied to the cattle of the Alambadi type) always sell at a much lower price than the "Nattu-madu" or local cattle of the hotter and drier districts of the south. In South Coimbatore, the former are said to have a working life of only six to seven years, against ten to twelve years of the local cattle; while further south again in the Palni taluk, such animals are very seldom seen as they are said to last only for two to three years. In the black cotton soils of Tinnevelly, South Ramnad and Madura, Kangayam cattle are now almost exclusively used for agricultural work. The same type of cattle as the "Malai-madu," however, in Anantapur district is said to last for ten years. Cattle, if moved when young, get acclimatized more quickly. The Nellore breed, which supplies the bulk of the heavy cattle to the Ceded Districts and which are brought there while young, soon seem to become acclimatized and last from ten to twelve years and even longer, while full grown cattle of the same breed when taken to the southern dry districts have, it is stated, the same short life as the Alambadi. The draught cattle of the West Coast are mainly taken there when quite young and are reared, and appear to become more or less acclimatized to the change.

This susceptibility of cattle to changes of climate should be borne in mind in any attempt to improve cattle breeding by the supply of breeding bulls.

Cattle breeding is also to a certain extent dependent on the climate, but more so probably on the soil and the distribution of the rainfall. The degenerate cattle of the West Coast are a case in point. Yet with care it is possible to rear very fair cattle on the West Coast and, in fact, there is a considerable amount of cattle rearing done in South Malabar. The local cattle of the West Coast are however usually allowed to fend for themselves and suffer at one time from abundance of quickly grown succulent pasture and at another from long periods

of starvation. Yet on the Taliparamba agricultural station some very fair cattle of the local breed have been reared, simply by making provision for supplementing pasture with dry grass or hay, when the dry weather sets in. West Coast cattle can never, however, attain to any size or bigness of bone owing to the lack of lime, both in the soil and in the pasture and fodder, and, it is worthy of note that the soils of the tracts, where the two best known breeds of Madras cattle are bred and reared, viz., the Kangayam and Ongole breeds, are both very rich in lime. Cattle breeding naturally seems to find root in dry districts or districts liable to scarcity, as instanced by the Kangayam, Ongole and North Salem breeds. This may be due to some extent to the climate, but, more probably, it is because ryots are in such tracts more careful to preserve their fodder against times of scarcity and this had led to a more careful feeding and management of their live-stock. Sheep again seem very sensitive to climatic conditions. None are kept on the West Coast; a few are occasionally brought there for butchering and of recent years they have been taken to Palghat for grazing and manuring the wet lands in the dry weather; but these latter all return to Coimbatore before the rains begin. Mortality among sheep is very high when the rains set in even among the hardy hairy sheep of the hotter districts. Wool bearing sheep are practically confined to those parts of the Presidency which have a cold weather and it is very seldom that these are seen anywhere else.

IV.—THE DEMAND FOR, AND SUPPLY OF, DRAUGHT CATTLE.

The demand for draught cattle, for the Madras Presidency, can be taken roughly at one pair of cattle to 10 acres of cultivation. The number of ploughs, given in the quinquennial census of 1909–10 is 3,895,537 while the normal area of cultivation for the same year is 36,687,000 acres. Or, again, the total male stock of cattle and buffaloes over four years of age, is given in the same census as 7,403,387 head, or 3,701,693 pairs of cattle. Both these figures are approximately 10 per cent of the normal cropped area. The area cultivated by one pair of cattle at first sight seems low, but, when it is considered that there are about 10,000,000 acres of rice and 1,400,000 acres of garden cultivation, for which one pair of cattle are required, approximately, for 6 and 2 acres respectively, this raises the demand for ordinary dry cultivation to nearly 15½ acres a pair. This figure is low for black cotton soil where 30 to 40 acres can be worked by one pair of cattle, but in many places for lighter soils the figure is high. No deduction has been made for road traffic, as the bulk of this is done by agricultural cattle in the off season. It will thus be seen that the supply at the present time just about meets the demand. As regards the future it is difficult to forecast what will happen. Although the Season and Crop Report for 1910–11 gives an area of 9,318,000 acres of culturable waste, much of this is unfit for permanent occupation, and further development must be in the direction, rather of intensive than of extensive cultivation, and this is only possible with the aid of irrigation. This consequently means a large increase in wells and well irrigation, and, especially in the southern districts, one already sees this taking place,

as a comparison of the following figures taken from the Season and the Crop Report will show :—

	Area of culturable waste, 1910-11.	Area under well cultivation, 1910-11.
	ACS.	ACS.
Average of the eight southern districts	184,400	102,760
Average of Gōdāvari, Kistna, Guntūr and Nellore	383,857	33,498

This line of extension, which is bound to develop as the population increases, means a much greater demand for better draught cattle, and already the supply is beginning to be short of the demand. This is especially so in the three districts of the extreme south, where little use can be made of the "Salem" and Alambadi cattle for heavy draught. The Madura and Ramnad districts are the only two where difficulty is reported in obtaining draught cattle, though everywhere complaint is made of the great rise in their price. In the cattle markets of Madura district prices are higher than anywhere else in the Presidency. In Tinnevelly matters are not so serious; this is the tail end of the line of cattle fairs, and dealers never take animals north from here, but always dispose of them for what they will fetch. This district also attracts better cattle since the ryots of the black cotton soil pride themselves on their fine bullocks and can afford to, and do, pay good prices for them. It is also the market for supplying good draught animals to Ceylon. It is probable that more of the Kangayam type are sold at the Kazhugumalai cattle fair in the district than at any other fair in this Presidency. The employment of cows for agricultural and draught purposes is common in most of the southern districts, which seems to point to a shortage in the supply. In parts of the Melur taluk of the Madura district even wet cultivation is done by cows. In South Salem and East Coimbatore, cows are commonly used both for ploughing and also in some cases for mhot work. While in the cattle breeding and rearing tract of West Chittoor, North Salem and Kollegal, cows are as commonly used as bullocks, if not more so, even in many cases for cart work. Apart from sentimental objections, there is much to be said for the working of cows except, possibly, where they are used for wet cultivation. Primarily it ensures the animals getting something to eat. In the Maluvalli taluk of the Mysore State, which produces very excellent cattle, one sees very fine cows being worked in the fields. The animals are very well cared for and are kept in excellent condition, even in a year, such as this, when fodder is anything but plentiful, and, if cattle breeding is to be encouraged among the smaller ryot class of this Presidency, it seems essential that the female stock should be used both for work and for reproduction. The cows of the Dharmapuri taluk which are trained to work have a considerable market value, while in the Nallamalai breeding tract of the Kurnool district, where cows are owned under very similar conditions, these when dry have no sale value at all, since they are never worked. It is natural that, if cows have a distinct market value, they are much better cared for than if they have none.

In the southern districts the chief source of supply is the Coimbatore district and North Salem, besides which very large numbers are imported from Mysore. Cattle are even brought down from as far north as the Bellary district. In the northern part of the Presidency, there seems to be no scarcity of cattle, although they have risen generally in price. The Vizagapatam district, the uplands of Gōdāvari and the Nellore and Guntūr districts are, at present, able to supply most of the demand, which is supplemented by importations from Hyderabad and Mysore.

The rise in price of cattle has, however, been an incentive to produce better cattle. Many cases have come to notice where petty ryots have of recent years taken to rearing promising looking young cattle as a means of adding to their income. Such animals would formerly have been left to fend for themselves, in which case they would never have been of much value. Excepting the West Coast and delta tracts, it may be said that all districts are practically self-supporting as far as light draught animals are concerned.

V.—GRAZING AND CONDITIONS UNDER WHICH BREEDING IS CARRIED ON.

The question of grazing is becoming more and more insistent as the area of cultivation increases, and therefore the question deserves detailed examination.

Communal grazing.—This consists of grazing on land to which every one in the village has an actual or accepted right. This is comprised of communal lands set apart for the purpose, of unassigned waste lands, of tank beds, the sides of drains, roads and other poramboke land; usually also of harvested wet lands and of dry lands which have been left fallow. Many of these sources of grazing, as the cultivated area extends, or the village expands, are constantly being reduced in area and thus the ryot, who has depended on free grazing from time immemorial is on all sides beginning to feel, and sometimes acutely, the lack of pasture. As time goes on and cultivation continues to expand either intensively or extensively, he will feel it more and more, until some other method of farming is evolved, which includes the care of his animals. In some parts of the Presidency this evolution can be seen even now, of which the Dharapuram taluk of the Coimbatore district is an excellent example. This is a taluk where there is no culturable waste, no communal grazing land, and no forest grazing; yet, it is one of the best known cattle breeding centres of the Presidency, and its cattle have a higher market value than any other, besides which, it contains some of the best garden cultivation to be seen anywhere in India, as well as an excellent system of mixed farming.

As far as the maintenance of the quality of the stock is concerned, nothing can be said in favour of communal grazing; in fact everything is against it. Where there is communal grazing, every ryot in the village naturally claims as large a share of it as possible, with the result that grazing lands are always overstocked, are never given a rest and are usually little more than exercise grounds for cattle. In many cases the number of cattle maintained is in excess of the ryot's

actual requirements, as well as of the number which he can normally supply with fodder in the dry season, and though the animals manage to exist for a time on a starvation diet, they are very prone to cattle disease and to suffer from changes of season. Enquiry into the hide trade shows that the supply of hides is always greatest when the rainy season commences. Not only do animals die under this treatment, or lack of it, but the female stock breed very irregularly and, if the cows are not barren altogether, they seldom calve more often than once in three to four years. This is a most important point; the quinquennial census shows that, on an average, a cow only rears a calf once in 5¼ years. Communal grazing is, and must be mixed grazing, and, since male stock are never castrated before they reach maturity, this leads to the evils of imbreeding and promiscuous breeding and often permanent injury to the young male stock from serving cows when too young. Thus, even if the ryot were desirous of improving his stock by more careful breeding, this is impossible as long as he has to depend on communal grazing.

Forest grazing.—This is ordinarily the grazing of cattle in the reserved forests on payment of a nominal fee per head, though, in times of scarcity, the forests are thrown open, when necessary, for free grazing. Normal forest grazing can be divided into three classes—

(1) Cattle, which live entirely or almost entirely in the forests and are kept in pens there, i.e., breeders' cattle, such as those of East Kollegal and the west of Dharmapuri and Hōsūr.

(2) Cattle, belonging to villages adjoining the forest which are occasionally breeders' cattle, but more often are kept, either for the sake of the manure which they supply, or for the sake of prestige; a man's position and wealth in the village being reckoned by the number of stock which he keeps.

(3) Cattle, which come from a distance to graze in the forests during the cultivation season.

In the forests of Kollegal, North Bhavāni, Dharmapuri and Hōsūr, which represent the most important area of forest breeding, the cattle, which graze in the forests, are cows with their calves; except for the breeding bulls, which run with the herds, no other male stock are seen. The male stock are annually sold as yearlings at big fairs such as Mahadeswaramalai, Gettisamudram and Mecheri and find their way into the hands of ryots who rear cattle. Throughout North Coimbatore, North Salem and West Chittoor, as well as in the adjoining territory of the Mysore State, the rearing of bullocks from these forest bred calves is a most important industry. It not only forms a profitable method for ryots to realize the value of their available straw, fodder and grass, but it also forms the main supply of heavy draught cattle for Malabar, West and North Coimbatore, Chittoor, North and South Arcot, while the pick of such animals are taken further south to Tanjore, Trichinopoly, Madura and Tinnevelly to be used either as coach bullocks or for heavy draught. This breeding is one of the finest object lessons one can see in the Presidency to show the value of not mixing the cattle when grazing. The cows, though in miserable condition when they were seen in the hot weather,

were all big framed animals, while the bullocks, reared from calves produced from these herds, show still more clearly how valuable it is, even when grazing is limited, to select and keep good breeding bulls. These Salem and Alambadi cattle are very different from the animals which come from the Bhadrāchalam forests of the Gōdāvari district, which are small ill-bred animals. In the cattle, which come from here, one sees all the evils attending mixed grazing, the surplus male stock are never sold until full grown and fetch, even at present high prices, from only Rs. 7 to Rs. 20 per head.

Cattle belonging to villages adjoining the forests, which may be breeders' cattle, but more often are kept for the sake of the manure they produce or for prestige.—Usually such cattle are kept for the two latter purposes, though occasionally they are kept to some extent for the former. It is a noticeable fact that the nearer cattle are to the forests, the more degraded the type. Here one sees all the evils of mixed grazing. In most of such places, the forests are at low elevation and have not as yet recovered from the period when they were unreserved and seldom are they able to provide grazing throughout the year. With such light grazing fees, large herds of cattle are maintained and it is usually the case that such animals in the dry weather are barely able to exist. The ryot has not the fodder supply necessary to maintain his cattle in such numbers in the dry weather. In many places such animals are maintained simply as a cheap and easy method of manuring the lands. The young stock produced are so poor that they are capable only of the lightest work and often ryots, who own large numbers of cattle, have actually to import their working bullocks. A good example of such a degraded system of farming was seen around Chendragiri in the Chittoor district. Here large numbers of cattle are maintained in the villages, which are of no use except for their manure, and all bullocks, required for garden cultivation, have to be bought from Punganūr. In other places a man's position is gauged by the number of stock which he maintains. Often he is entirely dependent on the forests for their maintenance. The Cumbum valley in the Madura district gives a striking instance of this. Here many of the owners of the largest herds of cattle are merely landlords, leasing out their lands on varam, in which case the kudivaramdar or tenant gets the straw, which should be the reserve fodder supply in the dry weather. Here all the best animals are owned or reared by cultivating ryots. Yet this valley was at one time famous for its cattle and it still produces a few good animals. It is one of the few places in the southern districts, where breeding bulls are still specially set apart and maintained, though they are not selected for any special quality, but all male animals born on a certain day of the year are set apart for breeding. Were it not for the adjacent reserved forests of Travancore, where grass is plentiful on the upland plateau, and where the Cumbum valley cattle are taken in the hot weather, there is little doubt that the breed would have disappeared before now.

The Cumbum valley forms an interesting problem with regard to grazing. Cultivation has now reached its utmost limits and any further extension must be in intensive cultivation, i.e., by the sinking

of wells. This means a constant supply of mhot bullocks, which cannot be maintained by reliance on the forests, and by the present lack of system in breeding. If the people were dependent on themselves for grazing, it would be quite possible for the valley to develop in the same way as the Dhārāpuram taluk of Coimbatore. The soil is rich in lime, it forms an excellent pasture, while the maintenance of the well-water supply must depend on the proper maintenance of the forests. Private pasture land, careful conservation of manure, combined with well irrigation, would greatly add to the production of the valley, while, when the breed of cattle has been worked up, there is no doubt that the profits from stock raising would be great. Even now the smaller ryot, who has straw fodder for the dry weather, can get Rs. 100 per pair more for cattle which have been hand reared, than the owner of large herds can get for those which are dependent on forest grazing.

Cattle which are sent to the forests from a distance for grazing during the cultivation season.—For delta and other tracts where cultivation does not allow of pasturage, it is the custom to send cattle often long distances for grazing. Grazing facilities in such cases are essential, and it is usually the reserved forests that people have recourse to. In the case of the northern deltas the more well-to-do cultivators send their cattle to private grazing grounds in the dry taluks of the districts; but the ordinary run of delta cattle, both from here and from Tanjore, are sent to the reserved forests for grazing. That private grazing is appreciated is shown by the high grazing rates which ryots are prepared to pay, and, in all probability, it is cheaper for them in the long run, as the animals are well cared for, come back in good condition, and, except when there are outbreaks of cattle disease, there is a very low percentage of loss. In the northern deltas it is important that the cattle should be in good condition when they return, as they are immediately required for threshing the paddy crop. In the Gōdāvari district, everywhere on the delta, complaint is made of the increasing mortality among cattle sent away to the forests for grazing. The animals there are left in charge of Sugalias, who, it is stated, make a considerable income out of the sale of green hides, etc., and consequently it is to their advantage if the animals left in their charge die. As the hide supply is being exploited more and more, the mortality among cattle under the present system of grazing naturally becomes greater.

Forest grazing is always a serious menace to the forests and not only to the forests but to the water-supply of wells and tanks. It is more so where grazing is continuous as the cattle are then in the forests when these are dry Grazing and forestry are, and must be, at variance; for, as the forest canopy increases, the grass tends to disappear and the simplest way of lessening the shade and increasing the grass is by forest fires. Yet certain kinds of forest grazing are of great importance. The North-West Salem and North-East Coimbatore forests supply a large share of the heavy draught cattle of the south and, probably, this is of more importance to the country than the maintenance of heavy timber forests in places, which are not readily accessible for extraction. In Kollegal this cattle

breeding is rapidly declining and similar statements were made as regards Dharmapuri, but the cattle census figures for previous censuses had not been preserved and it was not possible to prove this by actual figures. The Hosur taluk on the other hand shows a steady increase. This decline is stated to be due to the stringency of the forest regulations, which, with the present system of forest blocks, prevents the movement of cattle from one block to another. The present system of permits is, more or less, a speculation, since the hot weather grazing is very dependent on local thunderstorms and, at the time of visiting Kollegal, rain had fallen in only one block. In another year it might be that another block would be favoured with rain. Everywhere throughout the breeding tract the general complaint is that, where there is water for the cattle, there is no grass and *vice versa*. In one of the best breeding villages in Kollegal the owners had actually sold two out of four of their breeding bulls, since they were too valuable animals to risk losing. A few rich breeders take out permits for more than one block, but the smaller breeder cannot always afford to do this. If the block system is instituted as a check on forest offences, it should be possible to endorse permits made out for one block to allow grazing in another block, where early pasturage or water is available, and it is not likely that forest fires would be purposely started in blocks where there already is, early grazing. Something might be done to make more watering places for cattle in the forest, as the animals often have to suffer severely from the lack of these. In places, where it is customary for cattle from other districts to be sent for grazing, a system of grazing reserves might be advisable, i.e., reserves where grass, and not forestry, is the first consideration. This would not only protect the forest proper, but it would be possible to keep the animals in better condition and thus check the heavy mortality, of which, in many places, there is now complaint. In the Nellore district, where private grazing lands are owned and leased out, the mortality among the animals is reported to be much lower than in other districts which depend on forest reserves: moreover, the owner or lessees of such lands take very good care that the pastures are not overstocked. Grazing reserves would not necessarily mean a depletion of trees. A certain number are always required for shade. Dhārāpuram taluk where private pasturage is common, is possibly one of the best wooded of any agricultural taluk, and the bulk of these trees are grown in private pastures. The private pastures of Guntūr can always be located by the excellent growth of babool trees on them. People already pay considerably more for grazing on private pasture than they do in reserved forests, and if sufficient pasturage is provided to keep animals in good condition, there is no reason why higher rates should not be charged for such grazing, if it were found that it could not be provided at the presents rates except at a loss. If such grazing were regulated, not overstocked, and manure not removed from the ground, excellent pasturage should in time be formed; and it might be possible by the introduction of good bulls greatly to improve the class of cattle of a district where there are no possible means of improving the cattle in the district itself. Where cattle are maintained in the forests simply as a cheap means of manuring the

land, it seems only to retard agricultural development. The people are quite satisfied to remain dependent on the forests for their manure supply, instead of depending on and developing their own resources. The garden cultivator of South Coimbatore is entirely dependent on his own resources for his manure supply, and yet the garden lands here are as well maintained as anywhere in the Presidency. His cattle are also utilized as manure producers, but they are well-fed animals and produce manure not only in greater quantity but of much better quality. Nothing seems to develop agriculture so much in this country, as when the ryot has to depend on his own resources, and this seems more especially the case as regards cattle breeding and rearing. The manure supply from forest grazed cattle, moreover, is seldom required except for wet or garden lands, and the forests are of much more importance, as a protection to the water-supply, than as a means of supplying cheap manure through forest grazed cattle.

Private grazing areas.—Private grazing areas are of great value and importance to the country and every encouragement should be given to increase these. Everywhere where private grazing grounds exist, the cattle are good and care is taken to breed and rear good animals. This class of grazing can be divided as follows :—Temporary pasture and permanent pasture. Temporary pasture consists of harvested dry fields, of patta lands left waste (though in many cases these are treated as common grazing lands) and of patta lands, which are sown down to pasture. Permanent pasture includes patta land reserved for pasture, either on single or on joint patta, and, either for a leased rental, or for the pattadars' own enjoyment.

Dry lands when newly harvested are usually considered as private grazing. There is often a considerable amount of gleanings in the shape of the fallen pulse and cereal leaves and, until this fodder supply is exhausted, such lands are usually reserved for the grazing of the cultivator's own cattle. Patta lands, which are left waste, are occasionally treated as private pasture, but, more often than not, are treated as common grazing land.

The only two places where patta lands are regularly set apart for grazing, i.e., for temporary pasture, are in the two noted cattle breeding centres of "Plains Cattle," viz., the Ongole-Kandukur tract and the Dharapuram-Palladam tract. In the former tract, permanent pasture is perhaps more common, since the soil is very liable to wash, and there are large areas of patta land which cannot be cultivated, such as the lands adjoining rivers and streams. These streams can always be traced by these grass lands and by the growth of babool which gives the requisite shade for pasturage. But besides this, temporary pastures are also common ; even small areas of 3–4 acres or less are left for pasture, showing that even the smaller ryot of these fertile soils realizes the value of pasture for his cattle. Such temporary pastures are all of spontaneous growth and are not sown. In the Kangayam tract, temporary pasture is the rule, though exceptionally good pastures are often left for 20–30 years before being broken up. It is here that the famous "Coimbatore grass" known as "Kolai kattai pillu" (*Pennesetum cenchroides*) is found and the seed of this grass is regularly sown, mixed with a cereal, when land is to be laid down. Here private pasturage is rendered much easier by the

practice which prevails of fencing the fields. So valuable are pastures considered here, especially since the recent rapid increase in the price of cattle, that even garden lands are now occasionally laid down to pasture. This moreover is the only place in the Presidency where anything like systematic grazing is carried on.

Permanent pasture.—The practice of maintaining permanent private grazing grounds, although in some parts it is giving place to dry cultivation, in others is showing signs of development, and this should receive every encouragement, as it is the first step towards the improvement of live-stock. The practice is common throughout Nellore district and in the Kistna and Gōdāvari dry taluks, as well as in the north of Salem and in the Punganur zamindari of Chittoor district, while a few cases have come to notice where the system is of quite recent origin, even in parts where forest grazing is considered good. It is held by some that the cultivation of grass on patta lands lessens the yield of food-grains but it is a moot point whether this is so. Land laid down to temporary pasture is greatly enriched and, when ploughed up again, gives much better yields of grain. Moreover private pasturage enables the ryot to maintain not only his working animals, but also his small breeding herd and, if he owns his well in addition to his dry land, he is enabled to manure his garden lands well and to meet his own supply of working bullocks. Thus, though the dry lands may not directly produce cereals when under pasture, they tend to increase the production of the garden lands, and after all, except perhaps on black cotton soils, the production from the land is very largely governed, not by the area cultivated but by the amount of manure available.

General breeding arrangement.—Except in the recognised breeding tracts these are only remarkable by their absence. In the northern districts the practice of dedicating Brahmani bulls still exists, but these are not necessarily selected for any good qualities. Occasionally one sees animals dedicated for some deformity and it is the invariable custom to dedicate calves and not grown bulls. Since the animals are selected before they have developed their masculine characters, even if quality were a consideration, it would not be possible to make an adequate selection for this.

In the Vizagapatam district several of the owners of proprietary villages do now keep breeding bulls of the Ongole type and some excellent stock are to be seen bred from these. Some recognition of this might encourage the practice. In the Southern districts except in a few isolated places the practice of dedicating bulls does not now exist, and dependence has to be made on young uncastrated bulls for the reproduction of the species. The breeding arrangements in the breeding tracts will be dealt with when these are considered. Mixed grazing and late emasculation are the two great stumbling-blocks to the improvement of cattle in this Presidency.

VI.—FODDER SUPPLY.

The fact that one district or part of a district can usually supply another or another part, shows that in normal seasons the supply of

fodder, under the present system of livestock management, is more than sufficient. That this is so in many places, is evident from the larger numbers of old straw stacks which are to be seen. This is more especially the case in the Northern Circars. Old straw stacks are to be seen from Ganjām down to Nellore wherever paddy is grown. While in the deltas it is no uncommon thing to see straw stacks two and three years old. In the black soils of Guntūr and Kandukur, old stacks of cholam straw are a common sight. Madras is very favourably situated, as regards rainfall and water supply, as far as its fodder supply is concerned. Full advantage is taken of all the rivers which flow into the Bay of Bengal for irrigation purposes, and all districts, bordering the littoral are supplied, or can be supplied, if necessary, with paddy straw. Certainly more cattle are required to work these irrigated tracts, but they are usually animals of low value and therefore little attention is paid to feeding them; while in the dry season there is always a certain amount of natural pasture on the harvested wet fields. It is the more valuable animals, necessary for dry and garden cultivation as well as for heavy draught, which would be difficult to replace, that this fodder is mainly required for. The export of paddy straw from the irrigated tracts is facilitated also by the system of grain rents; the cultivating tenant often being forced to sell his straw in order to exist. It is districts which are away from the coast, that are more liable to failure of rains and crops. The Ceded Districts, however, do not require many cattle for purely dry cultivation. With the labour-saving implements in use there, it is possible to sow 30 to 40 or even more acres with a single pair of bullocks and, it is a very bad season, when this area cannot supply more than sufficient fodder for these. In recent years, moreover, the extension of well cultivation has done much to ensure these districts against scarcity of fodder. So also in Coimbatore, Salem, North Arcot and Trichinopoly, the development of well irrigation has largely protected these areas and it is no uncommon thing to see fodder cholam grown in small areas under wells for the use of mhot bullocks. Certainly, well irrigation means an increase in the number of working cattle, but not so much as it would seem at first sight, for, when rain falls, they are not required for irrigation and are available for the cultivation of dry lands. At the present time in the districts of the extreme south, viz., Ramnad, Madura and Tinnevelly, it is reported that the fodder supply is insufficient. This is due to two causes, viz., the high price of cotton, which has led to the extension of cotton to the exclusion of fodder cholam on the black soils, and the introduction of Cambodia cotton. This latter cause is, however, only temporary and its resultant effect will really be beneficial both to the fodder and food supply. The cultivation of this crop has spread like a wave through all the southern districts and ryots, finding how profitable was the cultivation, have grown this on their garden lands, and even on precarious wet lands, regardless of rotations. They are now beginning to find that to get good crops of cotton it is essential to rotate this with cereal crops. The result has been, however, to put much capital into the ryot's hands, which has enabled him to improve his existing wells and to sink new ones, thus greatly extending the area under well irrigation.

The total area under well irrigation for these three districts for the last three years are, according to the Season and Crop Reports, 265,870, 279,021, 302,960 acres, respectively. The West Coast fodder supply always runs short before the end of the hot weather. Paddy, which is the main crop here, does not tiller like it does on the East Coast and the straw is always scanty. Harvesting in Malabar, also, is defective and often half the straw is left on the fields. Little, or no use is made of the abundant growth of hill grass immediately after the monsoon except for immediate grazing and for cutting at thatching grass. Malabar is in a worse condition than South Kanara as wet cultivation in the latter district is much more advanced.

The cultivation of fodder crops, as an ordinary agricultural practice, is mainly confined to two tracts, viz., the northern deltas, where sunnhemp is grown as a fodder crop after the harvest of paddy, and the black cotton soil tract of the extreme south, where fodder cholam is grown. In the dry lands of the northern delta districts, especially in Guntūr, cholam is grown, as a first season crop, mainly for fodder. The Season and Crop Report for 1910–11 gives a total area of fodder crops of 264,000 acres, of which 254,000 acres are grown in the tracts mentioned above. These figures, however, are not absolutely correct for the cultivation of small areas of fodder cholam or cholam mixed with cumbu under well irrigation is a common practice in Coimbatore and other districts, where well irrigation has developed, and it is becoming, it is reported, increasingly common. The Season and Crop Reports only show 3 acres last year and none for the three previous years as the area under fodder crops for Coimbatore. Though in many places fodder crops are not grown as such, preference is given to the cultivation of cereals which give either the best quality straw or the greatest bulk. The bariga crop of Guntūr (*Panicum mileaceum*) is peculiar to this tract, which is so noted for its Ongole breed of cattle, and is the main cereal crop grown in the second season, because, being a short duration crop, it is more certain than pyra jonna as a fodder supply. The korra crop of the black soils of the Ceded Districts (*Setaria italica*) is another example; the straw of this is said to be specially valuable as a fodder for the cold weather. In many places also the seed rate for cholam is much higher than is necessary and is sown so, mainly, with the object of getting a higher yield of straw. In the Ceded Districts it is a common practice to weed out, for green fodder, any plants of cholam, which are not likely to develop grain.

VII.—BREEDING TRACTS.

Kangayam (*Coimbatore district*).—This cattle-breeding area consists of the whole of the Dhārāpuram taluk, and with it may be included the adjacent parts of Palladam, Erode, Karūr, Palni and Dindigul taluks. Breeding, however, centres round the Kangayam division of Dhārāpuram taluk. Here it is that real breeding is carried on, but there seems to be no reason why, if encouraged, systematic breeding should not extend to the taluks above mentioned. Of course, there are black soil tracts in many of these taluks, where cultivation is much more profitable than cattle breeding, but it is the lighter soils of these districts which are most suitable. These are usually shallow soils, which

the uncertain rainfall of this tract renders uncertain when under crop, but they are sufficiently loamy in character to retain enough moisture for pasture for a considerable time. The best land for cattle rearing is probably what is known as "Odai jelly," a red loam full of canker gravel. Such soils are known to be cool and, even though shallow, are retentive of moisture, while the calcareous substratum is excellent for the formation of bone and sweetness of pasture.

The rainfall is also an important consideration. In all the taluks mentioned it is distributed throughout the year and is always precarious. Thus all dry crops may or may not fail. There is always an uncertainty about them, while cattle are a much more certain source of income from the land. Therefore the ryot has learnt to a great extent, to depend on his wells for his cereal grain crop, and, if necessary, also for his straw. The rainy seasons are three in number—(1) the hot weather rains; (2) the south-west monsoon; (3) the north-east monsoon; and, though the rainfall may not be sufficient to raise a cereal crop, it is practically always sufficient to raise a crop of grass and usually two or three flushes of pasture.

Grazing and fodder.—In the Dhārāpuram taluk grazing grounds are conspicuous by their absence * and this fact, combined with the universal system of fencing, has undoubtedly been one of the main causes for the development of cattle-breeding. Cultivators have early learnt to depend on their own lands (encouraged no doubt by the former "Pillu patta") for their grazing. Yet, even though this grass or "Pillu" patta has been abolished and grazing lands pay the same assessment, whether under crop or pasture, there still remain large areas of pasture land, nearly 40 per cent of the total culturable area of the taluk. These private pastures are common throughout Dhārāpuram and extend also into Palladam, Palni, Karūr and Erode taluks. Fencing is an essential for these grazing grounds and, without it, they would be of little use. With fencing the ryot has absolute control over his grazing and can limit the number of stock, which he maintains, but in spite of which the general aspect of the country shows, a far larger number of breeding stock than are usually to be seen. The tract is also fortunate in having such an excellent grass as Kolai kattai pillu (*Pennisetum cenchroides*), which is the mainstay of the temporary pastures, as well as of many of the more permanent pastures. Fencing also allows of a rotation in pasturage which is an excellent thing. In many pastures, manure is not collected and in consequence the crops, following the ploughing up of pasture, yield

* The following figures kindly supplied by the Settlement Officer of Coimbatore show the distribution of the total area available and not available for cultivation in the Dhārāpuram taluk:—

	ACS.
Roads and itteries	16,100·59
Tank beds, drains, rivers and channels	14,404·20
Village-sites, cattle stands, temples, threshing floors, burial grounds	9,832·60
Rocks, hills, salt lands	3,010·89
Reserved forests, flower gardens and topes	3,831·43
Bunds	232·78
Total ...	47,412·49

much more heavily than they would otherwise do. Thus, though pasture may limit the area which remains for the cultivation of cereals, it increases the acreage yield. "Kolai kattai" pastures are found throughout the tract and trials with this grass in Tinnevelly on the light red soils of that district show that its cultivation might be much further extended, if necessary; and its introduction, if grazing was regulated, would be of immense value. It is a grass with a bulbous root stock, which can maintain its vitality through the severest drought; it seeds freely and its seeds are easily shed. Thus a heavy rain at any season causes a rapid flush of pasture, which will in a few weeks grow to a foot or more in height. When the Idaikottai zamindari was under the Court of Wards a "Kolai kattai" pasture which afterwards formed a part of the home farm was leased out for Rs. 300 for three months' grazing. This was an area of 25—30 acres. With cattle now at double their former price the grazing would be worth double the amount or roughly Rs. 20—25 per acre. This was on land similar to that assessed at about 12 annas and in a tract with a rainfall of probably not more than 15 inches. Even when pastures are ploughed up the grass is not killed. In fact it is a practice to plough through a "Kolai kattai" pasture every third year to quicken the grass. Thus even freshly broken up lands continue to supply pasture when the crop harvest is over. In the Dhārāpuram taluk it was stated that, even lands, commanded by wells, are sometimes laid down to pasture. Many lands are actually sown with "Kolai kattai" grass seed when laid down.

The main unirrigated cereal crop in the Dhārāpuram taluk is cumbu and the straw of this, unlike that of other districts, forms the main fodder supply. It is a four-month variety with a branching habit known as "*nadam*" cumbu and is sown usually in July-August. This habit gives a fine straw and plenty of leaf and the straw is harvested when the dew is on for two reasons:—(1) The leaf is not brittle and does not break off. (2) The moisture supplied by the dew makes the fodder more succulent when it is stacked. With this cumbu straw there is always a proportion of pulse straw, since these latter crops are always sown as a mixture with dry land cumbu. The cumbu straw is, of course, supplemented by the straw of cholam crops grown under wells, and also fodder cholam is sown thickly as an irrigated crop under wells, in years of serious shortage.

Breeding arrangements and conditions.—The conditions here are very different to those in Ongole. Here the big breeder has many advantages over the small breeder. His herds are sufficiently large for him to be able to divide them up according to age and sex. Thus the cows with calf at foot are grazed in one field, dry and in calf cows in another, young male stock in another and so on.

As is the case all through the Southern districts there are no Brahmani bulls. All breeding bulls are private property and are the property of big breeders, most of whom do not allow petty breeders to have their cows served by them unless the offspring are sold to the owner of the bull. Of late years in-breeding appears to have become less common and now breeders often buy their breeding bulls from outside their own herd usually from the Pattagar of Palayakottai, who

is the biggest and most advanced breeder in the tract, thus showing that there is a strong tendency among breeders to meet the supply for good animals. The big breeder has also the advantage of selection which he uses to some extent, especially, in weeding out cows which do not breed regularly. Big breeders, when questioned, all stated that their cows bred once a year or thereabouts and that, if a cow did not breed regularly, there was no profit in it and the animal was sold. Smaller breeders stated that many cows only breed every two and sometimes three years; that they broke them into the yoke and used them for agricultural work which often made them breed, but, if that failed, they sold them to petty ryots who use them as working cattle, either in the mhot or for agricultural work—in fact for any work except carting. Thus it can be seen that the petty ryot is saddled with the worst of the female stock, that for the service of his cows he has, either to have them covered by a young bull, usually of his own breeding, or else have them covered by the bull of a big breeder to whom he has to sell the resultant offspring.

Rearing and feeding.—The practice among big and small breeders is very much the same, though, as a rule, the small man takes more care of his young stock especially of promising young animals. For the first six weeks the calf is allowed as much milk as it requires and is kept tied up during that period, after that, green grass is put before it daily until it has learnt to eat, when it is turned out to pasture, and the amount of milk allowed is gradually reduced until the animal is weaned. Small breeders, however, in the case of promising calves, allow them all the milk and in some cases, when the cow does not give sufficient, they draw milk from other cows and feed the calf by hand. Cows, whether in calf or in milk, weaned and growing young stock are given pasture when this is available. When not available, they are given fodder supplemented by a thin gruel made of pulse husks, bran of cereals, rice-water and the ground up pods of Vel-vagai (the white babool). Ground cotton seed is also added if necessary. As a rule young bulls are mulled when they get their second pair of teeth and are broken to the yoke before being sold. They are not trained for mhot work until they have cut their third pair of teeth. Young unbroken animals are never sold by big breeders. These are only sold by petty ryots, who are pressed for money.

Market for live-stock.—The main market is in the south where bullocks of this breed are much sought after, both for black cotton soil cultivation and for mhot and road work. Higher prices are paid for bullocks of this breed than any other. Rs. 300 to Rs. 400 is no uncommon price for a pair of good young bullocks, while cases are known where recently Rs. 700 has been demanded and given for specially good pairs. The reason for this is not far to seek. The Kangayam is an excellent doer and thrives on much poorer fodder than other breeds. It has an excellent constitution, is very hardy and will often last for ten or twelve years at mhot work, while the Alambadi (the other big breed of the south) will not, it is stated, last for more than six or seven years at the most, and often for not even that. Rise in prices of Kangayams has been much more rapid than that of other

breeds, which shows its popularity on the market. This rise is probably due to some extent to the rapid increase in well irrigation in the south. The number of carts also has risen within the last ten years (1900 to 1910) from 59,309 to 87,621.* Besides this outside demand, the large breeders themselves take their animals for sale to the cattle fairs held during the car festivals at Avanasi and Tiruppur.

From the above description of the Kangayam tract it will be seen that, even there, there is considerable scope for improvement, especially among small and petty breeders; and there is evidence also that in time if assistance is rendered, the art of cattle-breeding may spread to neighbouring taluks or even further afield. The improvement in the present breeding area and the expansion of the breeding area, both seem essential for the ultimate good of the country, and it is for this reason that the Kangayam cattle-breeding has been so fully described. Kangayam furnishes the best example in this Presidency of mixed farming, and mixed farming is bound to develop in dry taluks as the remaining available lands are taken up for cultivation. A well and garden lands supplemented by dry cultivation and grazing lands are the ideal conditions for mixed farming. The garden lands require heavy manuring and for this reason the ryot has to keep more cattle and live-stock than he actually requires for working the mhot, carting silt and produce and cultivating the land. The garden lands are, in years of scarcity, his mainstay both for himself and for his live-stock. Thus there is no reason why if encouraged he should not keep good breeding stock. To keep these in condition he must have ample grazing, which he should be able to procure on his own dry patta lands, reserved for this purpose, provided his fields are fenced. These would only be temporary pastures, and would manure themselves, and, if worked in rotation with other dry arable land, would not only maintain but would improve their fertility. This seems to be the ideal to aim at, especially in tracts of scanty rainfall and shallow soils. A start should therefore be made in the centre of the breeding tract to encourage the breeding of better stock, especially by the small and petty farmer. These people, being brought up in a breeding tract, understand the breeding and rearing of live-stock and already appreciate the profit to be derived therefrom. Thus the provision of sufficient breeding bulls seems all that is required here. These however would have to be provided in large numbers. A bull will not be able to cover more than 150 cows in a year, and even then, would require careful feeding to maintain him in condition. When the success of this course was proved, then would be the time to supply bulls to the adjoining tracts in the same way, and thus gradually extend the breeding area. It appears useless providing bulls in places where the people have no knowledge of cattle breeding and rearing, and consequently, no idea of the profits to be derived from this branch of agriculture. When they have learnt this, then is the time to try and effect some improvement. There are four essentials in placing bulls—

(1) The animal must be of a type acceptable to the people.
(2) It must be a sure stock getter.

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* Actuals only taken for purposes of comparison.

(3) It must be in charge of some one who has the good-will of all the classes of the community and understands the management of such animals.

(4) It must be placed in a suitable village where its presence will be appreciated, e.g., I was informed that a Government bull was placed in charge of the Deputy Tahsildar, Palladam, but was removed as its services were not made use of. The reasons given to me why the animal was not made use of were, that he was not a good animal: he was a very uncertain stock getter and Palladam is a village of Brahmans and shopkeepers and not of agriculturists and breeders. The supply of bulls could be maintained by a Government breeding farm or else by private purchase. The former seems preferable: for even the best local breeder has his limits, and there is already a considerable amount of mixed blood, introduced into the breed, which is not at all liked. The questions of how the animals are to be paid for, and how their upkeep is to be met, after being issued, are also matters which require consideration. There is no question here of making the animals Brahmani bulls as these would starve since all the fields are fenced.

The "Ongole" breeding tract.—The finest specimens of this breed are to be seen in the villages lying between the Gundlakama and Alluru rivers in the Ongole and Kandukur taluks. These, however, are not at all necessarily bred here, and fine animals can be found, throughout the dry taluks of the Guntūr district, as well as in the Kandukur and Darsi taluks of Nellore district. Many of the finest animals seen on these alluvial soils have been brought in for rearing from other parts of the district. One sees here cattle which have come from Bapatla, Narasaraopet, Guntūr and Vinukonda taluks, and there is little difference to be seen in the quality of these animals, and those born and bred in the alluvial villages. It is, however, possible for people who know the local breeds, to be able, often, to locate the tract from which an animal has come, thus showing that there are variations in the breed even within limited areas. The same type of cattle are to be found throughout the Nellore district and northward, throughout the dry taluks of Kistna and South Gōdāvari but, though the type remains, the quality, size and bone of the animals deteriorate, especially southwards as one gets further from the centre of the breed, viz., Ongole. The reason for this is almost certainly due to the large quantities of lime found in the heavy soils of Guntūr, which tends to form bone and sweetness of pasture. Breeding conditions vary very considerably throughout the breeding tract, so much so that. to be described, the breeding in the heavy dry soil taluks, north of Kavali taluk, must be separately treated from the breeding tract south of Kandukur. The former will be described first, though, even here, conditions vary greatly with the fertility of the soil. In the alluvium of Ongole taluk there are no large breeders. Even the biggest ryots of the best known breeding villages do not own more than 10—12 head of cattle, including their plough bullocks, and it is only when one leaves this. and gets on to the shallower black soils, such as are seen in around Kandukur and Addanki, that one finds ryots who own herds of up to 50 head of cattle. It is a noticeable fact, however, that the

small breeder pays much more attention to his animals than the bigger breeder both in the matter of breeding and of feeding :—in fact he often errs on the side of over-feeding and pampers the animals, bringing them to too early maturity. Early maturity is not required in India, as in Western countries, since the stock here are required for draught purposes, and must be properly developed, if they are to stand the strain of years of work.

Grazing.—For this, ryots have to largely depend on their patta lands, and about one-sixth of the patta lands of the Ongole taluk are left fallow for pasture. The proportion, however, varies very considerably with the fertility of the soil. On the alluvium this is very limited, and the bulk of the pasture is permanent, being patta land which is liable to wash, and which is usually too much cut up by rain water to allow of cultivation. Off the alluvium, although permanent pasture is common on similarly situated lands, temporary pasture is much more common, and cultivated land is left fallow to grow babool and grass. No effort is made to lay down pasture, except that goats are folded at the proper season in order to sow babool seed. Excellent pasture springs up naturally and very rapidly. This consists mainly of the following herbage "Chengali gaddi" (*Iseilema wightii*), "Gohada gaddi" (*Andropogon monticolata*), "Nanamala gaddi" (*Andropogon carricosus*) as well as leguminous plants, such as *Indigofera linifolio* and *Phaseolus trilobus*. Chengali gaddi is by far the best grass and is common throughout the Northern Circars on heavy soils retentive of moisture. It is everywhere well known for its excellent feeding quality. Nanamala gaddi is a coarse grass which seems only to be eaten when more succulent pasture is exhausted, and is useful in making the grazing last out. Temporary pastures are left down for 7–8 years, i.e., until the babool trees are sufficiently grown to be of use for agricultural purposes. Permanent pastures are presumably held largely on joint patta; for on these several small herds of cattle are usually seen grazing, each in charge of their own herdman, nor is that care taken of these pastures, which one would expect, if they were singly owned. Prickly-pear and other useless shrubs are allowed to remain and occupy a large part of the area, which would otherwise be available for grazing, while all cattle droppings are scrupulously carried away, to be made into bratties in the village. In addition to grazing, all animals are fed with grass, etc., collected from the cultivated fields. This practice is common throughout the northern districts, but nowhere is it so largely practised as here, especially on the alluvium where pasture is reduced to a minimum compatible with cattle-breeding. The chief fodder for the cattle consists of jonna straw, the main south-west monsoon crop, and bariga (*Panicum mileacium*) straw, which except for a slight admixture of "Payeru jonna" (*Andropogon sorghum*) is the only dry land cereal grown in the north-east monsoon season. In addition to this the leaves and threshed pods of horsegram and other pulses are carefully stored. The greatest possible care is taken to collect all of this, the fields often being swept so that none of the fallen leaves should be lost. It can thus be seen that the cattle on the poorer black soils lead a very much more natural existence than those of the alluvium. Grazing lands

are much more extensive and not so much hand feeding, which means tying up, is necessary; while the crops, being poorer, not so much care is taken to remove all the straw and leaves from the fields, nor is grass so assiduously collected. Thus besides their more extensive pasture, the poorer cultivated lands afford considerable grazing for the cattle after harvest. In many of the breeding villages on the alluvium young stock are entirely hand fed and never get any exercise unless they are taken to be washed. This tends to make the animals slow and clumsy. Cattle which lead a more natural life, though they do not mature so rapidly, are much quicker and have much better feet. As concentrated food, the young stock get the bye-products of the pounder, such as the skins of pulses and the bran of cereals as well as the rice water from the house. Since none of the pastures are fenced, animals have to be brought in every night. During the cultivation season they are usually kept tied in the cultivated fields, where temporary shelters are built for them and their owners. At other times they are taken to the village, where they are very well housed, often in separate substantial cattle sheds, which are kept scrupulously clean.

Breeding.—In the alluvium villages the greatest care is taken of the female stock to see that they are not served promiscuously by any bulls. Often ryots travel their cows considerable distances, for the service of some specially good bull and they are never at a loss to say which bull has served their cow. In other places the same trouble is not taken and much promiscuous serving is done, either by inferior or immature bulls. The result is that very few inferior animals are seen in the former tract, while large numbers are to be seen where this care is not taken. Throughout this district, it is the custom to dedicate Brahmani bulls and some excellent specimens are seen, which are freely used by all classes of people. There are however many Brahmani bulls, which are very inferior and these are often sent away with the poorer class of stock to the hills for grazing. In respect to the use of breeding bulls, the petty breeder is very much better off than in the Kangayam tract, as he can usually rely on the service of a tolerably good animal. Except on special occasions (on the death of an important member of a family) it is no one's business, however, to see to the replacement of bulls, which, after a time, are no longer of any use for breeding purposes, and as holdings become reduced in size, which has been the case in Ongole, the number of important persons becomes reduced in number. Thus in fasli 1310 there were only 437 pattas in Ongole taluk paying more than Rs. 100 assessment, and these only averaged Rs. 141 per patta. It is generally stated that cows only produced a calf once in 18 months and, more often than not, not more than once in two years. In this respect there seems much to be desired in the management of female stock. The Pattagar of Palayakottai (Coimbatore district) who keeps several Ongole cows, states that these bred as regularly as his Kangayams which calve once a year or thereabouts. Here again the development of private pasture land seems to be an essential for cattle breeding. In Kangayam, cows are kept on private grazing grounds

as long as there is pasture, they are then stall fed, whether dry or in calf, while in Ongole dry cows are sent to the hills for grazing. Certainly the Kangayam is not recognized by breeders as a milking breed, while the Ongole is and, in all probability, cows in Ongole do not get sufficient feeding when in milk to maintain them in condition. Certainly the cows seen in the villages, were anything but fat, while the heifers which were prepared for sale were far too fat.

Marketing.—There are great differences between this breeding tract and that of Kangayam in the matter of sale. In Kangayam the sales are almost entirely confined to that of grown bullocks, broken in to work. In Ongole and the district, male stock are usually sold when under two years old, chiefly to Nellore traders, who take them to Kurnool and the Ceded districts. Besides this, there is from Ongole a large and increasing export trade in cows or rather heifers in calf. This must be a great strain on the breeding stock of the country, since these are the pick of the rising generation of cows. Within the last three years 4,033 cows have been despatched by rail from the Ongole taluk alone. This is a large percentage considering that the taluk only owns some 15,000 cows, which include, old, barren and inferior animals.

The marketing of the stock seems to be the weak point in the Ongole breeding tract. Male stock would, if reared to three years old and broken in, bring in a much better return than the selling of young stock. The rich delta ryot of Kistna and Gōdāvari can afford to, and does pay big prices for animals of this type; but he prefers to go to the Vizagapatam markets, where the best animals are brought to the shandies for sale, and where there is no difficulty or delay in suiting his requirements, as there would be, if he came to Guntūr and had to go from village to village seeking what he required. A good market such as this, if opened up, would be a great encouragement to breeding and a much more certain source of income than many of the dry crops now grown. It would induce the people to keep their cows in the district, it would encourage private pastures and it would supply them with their own dry land working cattle free of cost; for they would get at least one, and possibly two seasons work out of their young bullocks before these were sold.

The supply of breeding bulls also requires consideration. The present system of dedicating Brahmani bulls was quite suitable in former times when larger herds were kept, but, now that the ryot only owns a few animals, it is much more difficult for him to select a good bull for dedication.

The Nellore breeding tract.—Breeding conditions here, as stated above, are absolutely different to those in Guntūr. Here curiously enough the principal breeders live in the wet villages on the Pennar delta. This is one of the few cases known in the Presidency where wet lands ryots take any interest in cattle breeding, and the interest taken here is purely for the sake of the profits obtained from this branch of agriculture; for, in their own wet cultivation, this breed of cattle are very little used. Only inferior male stock which cannot find a sale are used while the bulk of the ploughing cattle in these

wet villages are, either buffaloes, or what are known as "Bhadrachalam" cattle, i.e., cattle brought down from Bhadrachalam and the Nizams's Dominions. The young Nellore bulls, which are bred locally, are sold as yearlings to Nellore dealers, who take them through into Cuddapah for sale to the garden land and black soil ryots of the Ceded districts. The bulk of the breeding stock are kept by big breeders many of whom keep from 100 to 500 breeding cows. Most of these breeders have their own private "Kanchas" or pastures on the deltas, but these are limited in area and, besides these, they either have their own pastures in other parts of the district, chiefly in Rapur taluk, or else they rent out private "Bedus" (pastures) in the inland taluks where their cattle can be sent for grazing. Thus, as one pasturage is exhausted, the cattle are moved to another and this continues until the paddy harvest, when the animals are brought back to the delta where they get grazing on the harvested fields and are handfed with a paddy straw. Dealers go round annually to these villages and buy up their yearling bulls.

Breeding bulls are here dedicated in the same way and for the same reason as in Ongole. Here there are rich ryots, however, who have large herds to select their bulls from, and there is not the same danger, that there is in Guntūr, of inferior animals being dedicated. Here again the private pasture is the mainstay of cattle breeding and, so much are these appreciated that, large prices are paid for grazing land. One pasture, which was seen on the Pennar delta, was recently bought by a rich Reddi for Rs. 125 per acre. This was a poor sand driven pasture near the sea coast with a very indifferent herbage. No care seems to be taken here to separate stock while grazing. All are grazed together and, since it is the inferior young male stock which are mainly retained, there must be a considerable amount of promiscuous breeding, which is very detrimental to the herd. Every encouragement should be given to the cattle breeding of this tract, since it supplies a large part of the Ceded Districts with their heavy bullocks for black cotton soil cultivation.

The Alambadi breeding tracts.—The breeding area proper is comprised of the deciduous forests of east and south Kollegal and north Bhavani taluks of the Coimbatore district, and south Hosur, and west and south-west Dharmapuri taluks of Salem district, as well as the adjoining territory of Mysore. The cattle which are found here are all of the same type, viz., "Malai Madu" or hill cattle, though certain variations are recognized, which are largely due to environment and different conditions of breeding and rearing. Formerly the cattle of these hills wandered throughout the tract, at the will of the graziers, wherever most suitable pasture was to be found, and there was frequent interchange of breeding bulls. Even now, Kollegal breeders frequently introduce fresh blood into the herds by the purchase of breeding bulls, either from "Pennagaram" herds or from Malluvalli in Mysore. The cattle of the Barghur hills in north Bhavani are recognized as a separate breed. They are smaller, lighter and quicker than the main breed and are often of broken and mixed colours. The difference is, probably, due to the

fact that not the same care is taken in breeding here. Male stock are often not sold till full grown, and are allowed to run with the herd, with the result that there is much promiscuous breeding. The cattle of north Satyamangalam are again a degraded type of these hill cattle, due to mixed grazing and scarcity of pasture in the low lying forests adjoining the villages. The cattle north of Denkanikota in the Hosur taluk are also known as an allied breed. These are hardly forest cattle now, but are bred by ryots in the villages who often own their own private grazing grounds. These are described as "Masti"* and "Nundi" dana* and are very similar to the domesticated cattle of the neighbouring Mysore territory. The cattle of the main breeding tract are, however, very similar; those of Pennagaram side are said to be of bigger frame, but no other difference is recognized. These are known commonly by the name of "Alambadis," "Salems" "Mahadeswarabetta," "Cauvery valley" cattle; though, in different districts of the south, the bullocks are known by different local names, very often being called by the name of the fair at which the animals are bought.

In the regular breeding tract, all male calves are sold when young, i.e., under one year old, and these are taken by dealers to recognized rearing tracts, chiefly in North Salem, West Chittoor and the adjoining Mysore territory. Ryots of North Coimbatore also visit the Gettisamudram fair in Bhavani, as well as the breeding villages in the hills, and buy large numbers of calves for rearing. West Coast dealers visit the fairs of Dharmapuri and take away calves to the West Coast for rearing. Thus, in the breeding tracts, male stock are seldom seen; most of the agricultural and draught work is done with cows. The only cattle seen in the forests are cows with their young, young female stock, and breeding bulls. It is usually stated that one bull is required for every fifty cows but nowhere were bulls kept in this proportion, nor are they necessary, since these cows seldom calve more frequently than once in three years. The breeding herds live in the forests for the greater part of the year, where they are kept in pens at night time. They are brought back to the villages at harvest time, when the harvested fields provide pasture for some time, and the cattle supply the necessary manure for the succeeding ragi crop. After this source of grazing is exhausted, the cattle again return to the forests. Except for this, cows are only brought into the villages, when they are too weak or emaciated to keep with the herd, or immediately after calving, until the calf is old enough to follow the herd. Occasionally, when the village is located near the forest pasturage, animals return to the village every night. The breeders of these cattle, except on the Hosur plateau, cannot be considered as ryots. They certainly grow crops for their own requirements, but, by profession, they are breeders of cattle, depending on the sale of their calves for their livelihood; and within recent years owing, it is stated, to the stringency of forest regulations their lot has been anything but a prosperous one, as the following figures, taken from

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* Notes on Mysore cattle by A. Krishnaswami Ayyangar.

the cattle census records for the principal cattle breeding villages of East Kollegal, will show :—

Name of village.	Number of cows. Fasli 1314.	Fasli 1319.
Mahadeswaramalai (Suluvadi)	4,809	2,721
Dantalli	709	635
Ponnachi	2,678	1,185
Ramapuram	865	855
Satyamangalam (Kaggalam)	1,080	449
Kuratti-Osur	1,459	808
Pudunagaram	732	775
Badranalli	1,461	726
Total ...	13,793	8,154

i.e., a decrease in five years of over 40 per cent. The breeding villla-ges of the Hosur taluk have, however, shown more than a corresponding increase. The total number of cows, for sixteen of the principal breeding villages, has risen from 7,809 in fasli 1314 to 18,875 in fasli 1319.

These are the principal breeding tracts of this Presidency but there are other minor breeding tracts which supply cattle of a sort. The Bhadrachalam taluk and adjoining territory of Hyderabad and the Central Provinces supplies are inferior grade of working bullock, which are imported to the Northern deltas and the Pennar delta of Nellore. Those which go to Nellore seem to be the pick of these, and this district also consumes the greatest quantity. The Gōdāvari and Kistna deltas of recent years have depended, rather on Vizagapatam, for its cattle, as these are more reliable and are properly broken in to work when purchased.

In Markapur taluk of the Kurnool district, a considerable amount of cattle breeding is still carried on. There are principally forest bred animals and formerly known as "Dupad" cattle. Cattle breeding here varies very considerably. In some places cattle are depended on for the manure supply and, in consequence, breeding has greatly degenerated; so much so, that mhot bullocks have to be bought from outside. In other places ryots depend much more on their cattle for their livelihood; in addition to forest grazing, the breeding herds and young stock are fed with straw. Bulls are not sold till from 3–5 years old, when they are sold at good prices to adjoining villages for mhot work. Here also the ryots select their breeding bulls from their own stock, whereas, in many villages, bulls are bought for breeding purposes from Nellore dealers coming westward. In other villages again, bull calves are sold as yearlings to Nellore dealers. Cows are never used for work in this tract, and have in consequence no sale value. Bulls are never castrated until they are aged, in fact castration is considered a sign of old age, and greatly reduces the value of the animal. This is persumably a mixed breed, probably a mixture of the Ongole and some hill breed which has now, become a fixed type, or, it may be that, a new breed has been formed since the famine of 1868 (when it was reported that the breed practically died out), by the importation of Guntūr cattle as bulls for the remains of the breeding herds. The cattle have the pendulous ears, the white or piebald skin, the well

developed dewlap and the pendulous sheath, in the case of bulls, or the loose flap of skin, in the case of cows, of the Ongole breed. The hind legs are also longer than the front, giving the back an upward slope to the hind quarters, as in the Ongole. In other respects they differ considerably. In the case of the bulls, the head is more like that of the Alambadi, with the same shaped horns only shorter. The body is round and compact, like that of the southern cattle of the Cumbum valley and the chest is broad. The legs are good and the feet are very large and are said to be very hard. In colour they vary considerably. From white to "maile" (grey), either brown or black "maile" and from "maile" to black or dark brown. Often also they are broken red and white in colour. The bulls are quick moving and spirited and are an all round useful breed for draught purposes. The cows of this breed though smaller, bear a strong resemblance to those of the Kangayam breed, except for their more pendulous ears and the loose flap of skin at the navel. These are mostly white in colour with the same peculiar brown "maile" markings on the forelegs as is seen in the Kangayam breed.

The Yerramalai hills of Kurnool district, also breed cattle in considerable numbers, which are used locally for the cultivation of lighter soils. A few animals of this type were seen at the Ranipet shandi being brought down by Adoni dealers. A detailed description of the Kurnool cattle breeding is to be found in "An account of the Kurnool district"*. In the Cuddapah and Anantapur districts there are several small centres of jungle breeding, of small sized cattle. These animals are, however, of little use agriculturally and are usually sold for fast trotting work for single bullock carts. One of these local breeds in the Kadiri taluk is said to be noted for its fast trotting bullocks and also for the fact that the male stock are castrated (not mulled), when under six months old.

In the Punganur zamindari in the Chittoor district, cattle-breeding and rearing is the most important industry of the rural classes. This zamindari used formerly to be noted for its milch cows, a very small breed of excellent milking cattle, and one still sees cows, of a sort, being taken to the Ranipet weekly market for sale from here. The original breed has however practically disappeared. Ryots have found the sale of grown bullocks more profitable and have imported good bulls from Mysore to increase the size of their calves and, thus, most of the Punganur cattle are now cross bred Mysores, which form a useful source of supply for the shallow mhot lifts of Chittoor and North Arcot districts.

In Coimbatore district, in the south and south-east taluks, and in south-west Salem there is a considerable amount of petty breeding of useful medium-sized animals of the Kongu type, known as "Kongu madu" or "Nattu madu."

The only other breed of any importance are the Cumbum valley cattle, but a severe outbreak of rinderpest some four years ago has greatly reduced these in numbers, and now they barely supply local requirements. As before mentioned, when discussing the question of grazing, the large herds are mainly owned by non-cultivating land-

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* "An account of the Kurnool district."—*C. Benson.* Government Press, Madras, 1889.

lords, who have to depend entirely on the forests of grazing; this is supplemented in the hot weather by grazing in the reserved forests of the Travancore plateau, which receives hot weather showers much earlier than in the valley. The cultivating tenants, who own most of the straw, rear very much better cattle, and often make the rearing of promising bull calves a supplementary source of income; and there is little doubt that this valley could be made a valuable source of supply, if there was a more equal division of property. Now the cattle are owned by the non-cultivating class, and the fodder by the cultivating tenant with result that the breeding cattle have to depend on forest grazing. Since cultivation here has now extended to its utmost limits, any extension in the future, must lie in the direction of intensive cultivation under wells, which, if ryots are made dependent on their own resources for manure supply and fodder, should lead to a development of mixed farming, and greater care would then be paid to feeding and breeding live stock. The cattle of this valley have many points in common, but are evidently of very mixed orgin. Formerly, before cultivation had extended to its present extent, this and neighbouring valleys were noted as grazing grounds, and cattle used to be sent here for grazing, from the east. The Pulikulam cattle, a quick trotting breed, said to have been evolved for the benefit of the Ramnad district zamindars for quick transit into Madura, are said by some to have been absorbed here, when they were no longer required after the opening of the railway. Certainly they have disappeared from Pulikulam and other villages of the Ramnad district where formerly they were bred. A Canarese colony of the Kappilean caste, who in the past settled in the Cumbum valley, brought with them from the north a sacred herd of cattle which still exist. These people keep their own breeding bull, besides which, the people of the valley dedicate to the herd any bull calves born on a certain day of the year; and these often graze with the village cattle. The practice of rearing and feeding bull-calves specially selected for their spirit as "jellicat" bulls is very common here and this is, probably, what has given to the cattle a more or less fixed type. Such bulls fetch fancy prices, often 3 to 4 times their market value as draught bulls. Rupees 200—300 is a common price for such animals while one was shown which, it was stated, had recently changed hands for Rs. 600. In the herds one often sees very fine cows resembling those of the Kangayam breed. Breeders state that these are the progeny of ordinary cows, and that occasionally their cows throw these big animals. This again points to the mixed origin of the breed. The colour also of the animals is very variable, "maile" is the common colour, but red, yellow, dun and spotted animals are also common. The description, given by Colonel Gunn of the Pulikulam or Jellikat* breed applies to the Cumbum valley cattle.

VIII.—REARING TRACTS.

These probably are as important as breeding tracts. In fact, they may be regarded as stepping stones to cattle breeding and there is

* "Cattle of Southern India."—Government Press, Madras, 1909.

no reason why, if the necessity arises, they should not be converted into breeding as well as rearing tracts; and in many parts of the country this necessity is already arising. Public grazing is becoming more and more restricted and at the same time cultivation is becoming more and more intensive, and thus the ryot is becoming more and more dependent on his own resources for his manure supply, which, except on heavy soils in districts of very light rainfall, is to a great extent the limiting factor of production. Not only this, but the great rise in the price of cattle within the last few years has often forced the garden cultivator to buy young animals and rear them for his own use, while it has also greatly developed the occupation of the professional cattle rearer. When, in addition to this, the manure supply has to be considered, it is evident that the garden cultivator has to keep more live-stock than he actually requires for working his own lands, and it is a small step for him to keep his own small breeding herd of one or two cows and breed and rear his own calves; and this, again, may further develop when he realizes the profits to be made from mixed farming. Nothing is so striking as the difference in market value of young stock, between ill-fed and well-fed, ill-bred and well-bred animals. This is strikingly seen in the Coimbatore markets, especially at the Puliyampatti market, which is the meeting place between the forest grazed cattle of Satyamangalam and the cattle raised in intensively farmed land of Palladam and Coimbatore. Young bulls of the same age vary in price from Rs. 8 to Rs. 80.

In almost all parts of the Presidency there are very considerable movements of young stock from the breeding tracts to the rearing tracts. These young stock may be reared for sale, as in the Vizagapatam district, or they may be reared for the ryots' own use, as in the Ceded Districts.

In the Northern Circars, the littoral of the Vizagapatam district, including the Chicacole taluk of the Ganjām district, is the great cattle rearing tract and it seems that, within recent years, a certain amount of regular breeding has also been carried on. Yearling male stock are brought up by dealers from the Gōdāvari, Kistna and Guntūr districts and are sold, either in the villages, or in the markets, throughout the littoral of Vizagapatam. Rearing is done by all classes of petty ryots and these young stock are evidently regarded as a reserve against times of scarcity. Moreover, they are used for agricultural work for dry cultivation on light soils, and thus, after the first year the ryot's working bullocks cost him little or nothing, since, as they grow, they are all the time increasing in value. The cattle when grown are thoroughly broken in and find a ready sale among the more wealthy ryots of the deltas. The Vizagapatam ryot is noted for the care, which he takes in feeding his young stock, and there seems to be no reason why, in time, he should not become a breeder as well as a rearer. In a few proprietary villages the proprietors have already dedicated good Brahmani bulls of the Ongole type and some excellent stock were seen in the markets which were said to be the progeny of these out of the better class local cows. Every year the Vizagapatam ryot is becoming better prepared for breeding. Wells are being sunk on all sides, and manure is being required in larger quantity for his

garden cultivation, while at the same time he is becoming less dependent on the rainfall for his supply of food and fodder. Besides the rearing of this type of heavy draught cattle, very large numbers of the ordinary cattle of the Vizagapatam district, are sold annually to the Gōdāvari delta, and the Gōdāvari ryot now prefers these, although they cost more, to the semi-wild cattle brought down from Bhadrāchalam. It is very probable, therefore, that this trade will continue to expand, and that more attention will be paid to the breeding of these. The owners of proprietary villages might be encouraged to select and set aside suitable animals of the local breed, from their own herds, as breeding bulls for their villages.

The whole of the black cotton soil area of the Ceded Districts may be regarded as a rearing tract. Young bulls up to two years' old are regularly imported every year by Nellore dealers and these are bought and reared by the black soil ryots for their own use. It is never likely, however, that cattle-breeding will ever develop here. Well irrigation is impossible on deep black cotton soils and there is not, therefore, that heavy demand for strong draught cattle which accompanies well irrigation. Moreover the black soils are the most valuable for dry cultivation being much more certain than lighter soils in these districts of short rainfall and are much more profitable as arable land than they would be as pasture. The manure supply, for dry cultivation on black cotton soils, is not so important in these dry districts; as heavy manuring tends to check the deep root system, which is necessary to enable the crop to carry through long periods of drought. The she-buffalo also is considered as essential for the household supply of buttermilk and curds, as well as of ghee, the sale of which provides a considerable share of the income of the blacksoil ryot; the she-buffalo takes more kindly to the very domestic existence which she has to live, than would the breeding cow. Cattle-breeding here would also entail the importation of breeding cows, since the demand is for very heavy cattle, which could not be produced from the local animal, and there would, even if these were available, be an additional risk in keeping such valuable animals, in a tract entirely dependent on an uncertain rainfall. The Nellore dealer now adequately supplies the demand. The ryot buys on the instalment purchase system, paying in three instalments, and, though high prices are paid, the ryot does not feel this since he has three years in which to pay for his animals, at the end of which time, they are probably worth more than double their original price.

In the west of Bellary district, Mysore bull calves are brought in large numbers and are reared by ryots of this tract. This profession is said to be steadily on the increase, since the rapid rise in price of recent years.

Punganur and North Salem, with the adjacent Mysore territory, form a large cattle rearing tract. Young stock are purchased, either from the Mysore State, or from the dealers in young stock, who buy in the fairs to which the Alambadi forest-bred calves are brought. This area supplies the mhot and cart bullocks of Chittoor, North Arcot, South Arcot, South Chingleput, as well as a considerable number of those used further south. In some parts, especially in the Mysore State, this rearing is overdone. The cattle are forced with

continuous hand feeding and, though, when taken to the market, they present an excellent appearance, they soon lose condition when put on ordinary rations and have not the stamina for continuous hard work.

The whole of the Coimbatore district may be regarded as a rearing tract. As already mentioned, the big breeder of Kangayam cattle always rears his bullocks, but, besides this, there are many villages throughout the district where cattle-rearing is a regular profession. The people of the Tottiyan caste are nearly all rearers of cattle, buying young calves which they rear and break in to dry cultivation. Their dry cultivation is done entirely with these animals and thus costs them little or nothing. In many Vellala villages, also, cattle are similarly reared. The animals are almost entirely hand-fed. Fodder and grass, when available, is collected daily from the cultivated fields, after which they are fed with straw and the bye-products of the house. For some two months before sale, they are given concentrated food, such as oil-cake, or cotton seed. In South Trichinopoly and North Madura cattle-rearing is fairly common, but not such careful rearing as is done in Coimbatore. The demand here for young male stock, which come from South Coimbatore and the Karur taluk of Trichinopoly, is dependent on the amount of grazing available after the rains of September-October, and the weekly supply, which comes to the Manapparai market, is regulated accordingly. A few villages around Dindigul have taken up this work of recent years, while, even in the Tanjore delta, people of the coolie agricultural class are taking to rearing bullocks. This extension of cattle-rearing seems to point to an increased demand for better class stock. South Malabar is also a cattle-rearing tract, though the class of stock, which are reared, are not perhaps of the best quality. Throughout the dry months of the year, i.e., from October till April-May a constant stream of young cattle pours into Malabar. Tudiyalur and Pollachi are the two distributing shandies in Coimbatore, from which cattle are taken to the markets of Palghat and Walluvanad. The Pollachi supply are chiefly yearling and two-year-old bulls, mostly of the local red breed of Pollachi, but also of small under-bred cattle of Palladam, Dharapuram and North Palni; besides these, young male buffaloes from 2 to 3 years old, which are collected from the irrigated lands on the banks of the Cauvery between Salem and Trichinopoly and Coimbatore, are sold at Pollachi to the West Coast. Those, coming from Tudiyalur, are either inferior animals of Satyamangalam or hill cattle, which are brought down chiefly from the Marali market in Mysore State. Malabar dealers also buy in the big fairs of Dharmapuri and take calves from there to the West Coast. These young stock are bought by ryots of all the southern taluks of Malabar and also by ryots of Cochin and Travancore States. Considerable numbers are also sold at the Kizhur fair, held in December, in the Kurumbranad taluk. These animals, if bought early enough, are grazed on the abundant pasturage, which springs up after the monsoon, while, later on, grass has to be collected and fed to them. They are helped through the hot weather and early part of the monsoon by paddy straw, bye-products of the house, jack fruit, etc.; and when the cultivation season commences they are used for light

work. These animals are kept and used as agricultural cattle until they cut three to four pairs of teeth, when they are taken to the markets and sold. They cost from Rs. 12—25 a pair and sell for from Rs. 40 to Rs. 80 or even more for specially good animals. The cost of rearing is practically nil, while they serve as work cattle for light work. Buffaloes are reared in the same way. In many amsoms around Kizhur, cattle rearing is carried on on a more extensive scale. Older and better animals are bought and are sold after a year or two.

IX.—BUFFALOES.

In the Madras Presidency, buffaloes are mainly kept for milking purposes, and, instead of the bull calves receiving more attention, as in the cases of cattle, it is the heifer calf which is more carefully looked after. Thus in only a few localities are good draught buffaloes to be found, and these are only in such places where they are used for heavy draught. The Woda or stoneworker caste, who are found throughout the Presidency, almost invariably use male buffaloes for dragging stone, and these people usually own fairly good draught animals. The buffalo is a much more powerful draught animal for its size than the bullock, but is much slower and where very heavy draught and short leads are required, they are often used: such as for carting timber out of the forest. They are also used where power is more important than speed, such as for working cane mills, and very occasionally for moht work. It is in the northern districts of Ganjām and Vizagapatam that the best male buffaloes are to be seen. In South Ganjām and North Vizagapatam the buffalo is regularly used as a draught animal by all classes, and, for ordinary bandi traffic, they are much more common than bullocks. This is the only part of the Presidency, where ryots, who breed buffaloes pay more, or as much, attention to the rearing of male, as they do to the rearing of female stock, and, as a consequence, this is the only part of the Presidency, where indigenous male buffaloes are really good. This excepts the Toda buffalo of the Nilgiris which can hardly be considered as an agricultural breed.

According to the cattle census of 1909-10, the total figures show that there are only 1,251,090 male buffaloes as against 2,199,071 cow buffaloes, and the only districts, where the male buffalo is in excess of the female, are Ganjām, Vizagapatam, Malabar and South Kanara. Taking the ghee producing districts of the north, viz.: Guntūr, Kurnool, Bellary and Cuddapah, these own only 106,781 male buffaloes as against 590,197 she-buffaloes, or in the proportion of nearly 1 to 6. It is generally allowed that the mortality among male buffalo calves is much higher than among heifer calves, but even allowing for this, the difference in numbers between male and female stock points to very large exports, the bulk of which find their way to wet land tracts, where they are used for wet cultivation. They are not so much used in the Gōdāvari as in the Kistna, some taluks in the north of the latter district using large numbers. They are a cheap means of draught and are not much loss if they do not last long. They are largely used in the Penner delta of Nellore district and considerable numbers are taken from Cuddapah district as far south

as the southern taluks of Chingleput. Coimbatore and Salem, the two main ghi-producing districts of the south, supply the bulk of the male buffaloes to South Malabar, where they are in great demand for wet cultivation. Coimbatore district is, practically, depleted of all its male buffaloes, there only being 9,292 in the whole district against 95 036 she-buffaloes, or in the ratio of less than 1 : 10. The moist climate of the West Coast suits this class of stock, and it would be difficult to recognize young animals, which have been here for a year or two, as the same stock as those which come over from Pollachi. South Kanara, which also largely uses buffaloes for its wet cultivation, depends chiefly on Mysore for its supply. These are brought down in very large numbers to the annual fair at Subrahmanya.

In South Kanara one sees very fine bull buffaloes which are kept by rich Bunt families for racing. They are not, however, used for any other purpose and are not allowed to serve cows. Most, if not all of these, are imported from outside the Presidency and often very fancy prices are paid for them.

The buffalo of Ganjam and Vizagapatam is the only really useful general purpose breed in the Presidency. The local breed are usually light-coloured animals with grey hair and reddish skin and light yellow tufts of hair on the knees and fetlocks. They are said to be hardier and to last longer than what are known as the "Kimidi" buffaloes, which are equally powerful looking animals, and much more striking in appearance, with their black skin and hair, their prominent wide forehead and thick short curled horns ; these latter are imported into the Presidency from Sambalpur. The local animal has thick, long horns, nearly straight with a slight upward curve, and good specimens when full grown will often measure nearly three feet across the hooks, with corresponding depth and breadth of chest. Large numbers of young animals are brought for sale to the markets of Chintada, Ungarada and Sundarapuram, which are bought by ryots for rearing. Very fine full-grown animals are also brought to the same markets for sale to dealers who take them south. Such animals will often fetch from Rs. 150—200 a pair, while even higher prices are paid for exceptionally good pairs. These latter are mainly bought by local rich ryots, who pride themselves on their buffaloes, in the same way as the black-soil ryot of Kurnool prides himself on his bullocks. Here, again, the heavier rainfall of these districts suits buffaloes. It is difficult to understand how such a fine breed is maintained. On enquiry, it was stated that breeding bulls are never kept and the service of cows is dependent on young bulls, which have not been mulled, or on older animals which have not been properly mulled. This seems to point to the fact that the breed could be greatly improved if care was taken in breeding ; and that, throughout the Presidency, much more use could be made of the male buffalo if he were properly reared and fed.

X.—MILCH CATTLE.

There are no really good milking breeds of cattle in the Madras Presidency, for the simple reason that in the country districts, among the agricultural population, milk, as such, is seldom used as an article

of diet. It is among the upper and middle classes and chiefly in towns that there is a demand for milk, and such people, although they own cows often feed them very well, have little interest in the calves of these. They require the milk for their own use, and the calf is simply kept to be with the cow to start the flow of milk, and its only sustenance are the strippings after the cow has been milked. Thus the bulk of the young stock born to milch cattle either die young, or are weakly and stunted, and fresh and heavy demands are continually being made on the country to supply this wastage. No effort is ever made to raise up a milking breed. Of recent years this demand has been greatly on the increase as the standard of living has risen. This is chiefly due to the habit of drinking coffee and tea, which has developed very rapidly, especially on the West Coast and in the wet land tracts of the south. The tea shop on the West Coast can be seen on any roadside. The Collector of Malabar reports that "one of the features of the last ten years is the growth of the tea-drinking habit and tea shops. Tea shops are to be found everywhere and in consequence of it demand for milk is now very great." In the Tanjore delta there is hardly a village where coffee cannot be obtained. Even among the cooly class of the Tanjore delta a certain number now have to have their coffee every morning, especially returned emigrants from the Straits. The coffee clubs of the larger towns of the southern districts are well known, where the men can have their morning cup of coffee without incurring extra expenditure in the household.

There is probably more wastage of good cattle from this constantly increasing strain on the pick of the village cows, which are absorbed by the towns than from any other source, and, already, two breeds of cattle have practically disappeared, viz., the Tiruchengodu cows of the Salem district and the Punganur cows of the Chittoor district; though, as before mentioned, the loss of this latter breed is due partly to crossing with Mysore bulls. The Ongole is possibly the best milking breed, which now exists, though the milk yields even from these are nothing remarkable. The export of cows from this breeding tract is assuming large proportions. Over 1,300 cows are annually exported by rail from the Ongole taluk alone, most of which come down to Madras; but there is hardly a town in the Presidency, except possibly on the West Coast, where Ongole cows are not to be seen. These animals are usually kept in wretched condition. They are big animals and take a lot of feeding, and they feel the change from the forced feeding of the breeding tract to the communal grazing grounds, on which they can find little or nothing to eat, and on to which they are turned out after their morning feed.

The only place where any real effort is made to meet this demand for milch cows is in the extreme south. The Shanar women around Virudupatti, Sattur and Aruppukkottai, who have to meet their household expenses by pounding dholl or redgram, have made the rearing of cows a special industry. They rear heifer calves which are bought up by then all through the south as far north as Dindigul. These are fed on grass, fodder, cholam and, as concentrated food, are given the husks of the redgram. These people often will not part with very good cows as they wish to keep the strain though apparently no effort is

made to have them served by a bull of good milking strain. The cows reared by these Shanars supply the whole of the Tinnevelly-Palamcottah demand, as well as a considerable proportion of that of Tuticorin, Travancore and Madura. Some 300 animals are taken south by dealers every month from here.

Trichinopoly and Coimbatore are dependent on supplies from villages in their respective neighbourhoods. In Salem, some very fair cows are still to be seen and are probably the descendants of the old Tiruchengodu breed. On the West Coast, where the demand for milk is always greater than the supply, there is a small effort to meet this. A considerable number of heifer calves are annually imported for rearing and some very fair cows are to be found in the Palghat taluk.

When milk is used at all by the ordinary agricultural classes, it is usually in the form of curds and buttermilk and, for the production of this and ghi, she-buffaloes are usually kept. Such milking buffaloes are very ordinary animals and seldom give more than three to four seers of milk a day. Those of Guntūr, Kurnool, Cuddapah, Coimbatore and South-East Salem have the reputation of being of better quality, but it is seldom that any of these animals give a higher yield than this. In the black-soil tracts of the Ceded districts, every household keeps buffaloes, and curds and buttermilk enter largely into the diet of these people who live on dry grains, while the ghi is a considerable source of income. An excellent description of the housing and care of these animals is to be found in "An account of the Kurnool district.*" In parts of Coimbatore district stud-buffalo bulls are occasionally kept.

Considerable numbers of she-buffaloes are annually exported from Cuddapah, Guntūr, Salem and Coimbatore. Those from the former two districts chiefly go to Madras. A certain number also come from Salem, but this district supplies more to Trichinopoly and Tanjore towns. The Coimbatore supply go to the West Coast.

XI.—SHEEP AND GOATS.

General.—This class of stock is kept for several purposes which are named below in the probable order of their relative importance :—

(1) For their manure.
(2) For butchering.
(3) For their skins.
(4) For their milk and its products of ghi and curds.
(5) For their wool.

The last two are only local. In many places sheep and goats are not milked, and wool is only of importance in places where wool-bearing or "kurumba" sheep are kept.

Sheep and goat manure.—This is one of the most important as well as one of the cheapest methods in vogue of manuring the land. Manuring is usually done by penning the flocks on the land when these are fallow, but, in the cultivation season when this method cannot be adopted, the flocks are collected for the night and, usually, the

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* An account of the Kurnool district by C. Benson, Government Press, Madras, 1889.

droppings are carefully swept up each morning and kept for manuring the land. Where flocks are owned by shepherds these are usually hired out to ryots, but the charges paid to the shepherd do not in any way show the value of the manure. This, if measured by the increased crop production, would be considerably more than the price paid to shepherds, especially when applied to garden lands, where, with the aid of water, the fullest use can be made of the manure by the succeeding crop. Different systems are in vogue in different parts of the Presidency for remunerating shepherds and very varying rates are paid to them. In the south the shepherds are paid so much per 1,000 per night. In Coimbatore so much per 100 per month. In Tinnevelly the rate is now Rs. 4 per 1,000 per night, exclusive of watching the flocks, which has to be done by the ryots themselves. This they do in their own interests, as they disturb the flocks two to three times in the night, to increase the quantity of manure. The rate has risen within the last 2—3 years from Rs. 3 to Rs. 4, but this rise is not in proportion to the rise in the price of food-grains.

For butchering.—All the male crop of lambs when grown, except the few which are required as rams, are as a rule sold to the butcher. Prices vary considerably according to the distance from the market, though about Rs. 3 may be taken as the present price for sheep and Rs. 4 for goats (sheep will vary from Rs. 2-8-0 to Rs. 5 and goats from Rs. 3-8-0 to Rs. 7). These prices are for the ordinary run of stock which have only been fed by grazing. Much of this is used in the country districts for meat and some idea can be had of the consumption in districts where these skins are disposed of in shandies. At Pollachi market, for instance, about 3,000 green skins are brought there weekly and a similar number are to be seen at Dindigul. In almost every market visited, where cattle are sold, there the skin trade is going on in similar proportions to the importance of the cattle side of the shandi. In those districts which supply the big town markets with meat and where a better quality of mutton is in demand, very much higher prices are paid and very much finer animals are brought for sale. In the southern districts of Trichinopoly, Madura and Tinnevelly, which cater largely for the Colombo meat market, much trouble is taken to prepare the animals for sale, and for good fat wethers (whether sheep or goats) high prices are paid —from Rs. 9 to Rs. 14 per head. Many of these animals will weigh over 60 lb. live weight. These animals are hand fed with cereal fodder and pulse straw and husks. This seems to be a regular source of livelihood with the petty ryot.

In the Manapparai market in the Trichinopoly district several fat sheep of the northern breed of Nellore and Guntūr were brought for sale. These were stated to have been bought at the same market on a previous occasion especially for fattening. The Hindupur market also sends large supplies, chiefly goats, to Tuticorin for the Colombo market. These are very fine animals, mostly wethers, and sell for from Rs. 18 to Rs. 23 per head at Hindupur, and were said to kill at 80 lb. dead weight when dressed. This market also supplies Bangalore, as well as to some extent Madras. For the Nilgiris meat supply, very fine wool-bearing sheep are brought down from Mysore to the Pulliampatti shandi in the Coimbatore district. In the

southern districts especially, even ewes are now being brought in the markets for sale to butchers.

Wool.—This is only of importance where the "Kurumba" sheep, which bear wool, are found: and these are practically confined to those parts, where the climate is dry and there is some pretence of a cold weather. In the southern districts, wool-bearing sheep are to be found in the cooler parts of Coimbatore and Salem districts, and they are also found in the hilly tracts of Madura. In the north they are found throughout the Ceded districts. In all such places the wool is used locally for spinning and weaving into cumblies. The price of cumblies is now more than double what it was five years ago. Sheep are usually clipped twice a year and if the wool is sold, it is usually sold as a standing crop, the buyer paying so much for the wool per 100 sheep which he has to clip himself. The hairy sheep is usually a bigger animal, and the flesh is considered of better quality, hence these usually fetch a higher price, especially in the southern districts.

Milk, curds and ghi.—Muhammadans are the only people who keep really good milking goats. Those of Madras and North Arcot are specially noted. The Mappillas also of the West Coast have their own breed of milking goats, which are said to have been imported from Arabia more than 200 years ago during the time of Muhammad Din Hamid Bin Abdulla Bin Ali. The breed has been kept up by rich Mappillas setting aside he-goats for breeding. These he-goats are known locally as "nercha-adu," to which the she-goats are brought for service. These animals are slaughtered on certain festival days, after having been kept for two or three years, and fresh young animals are then set aside. The Mappillas milch goats are said to give from two to six bottles of milk a day and their price varies from Rs. 10 to Rs. 40 per head. They are very carefully attended to and well-fed. In the Tanjore delta it is a common thing to see goats kept singly or in twos and threes, by villagers. These, in the cultivation season, usually, have a triangle made of bamboo fastened round their necks, the ends of which project and prevent the animals from trespassing. These are kept for meat and also for their milk, where the demand exists, but are not considered a milking breed. In many other districts, principally in the Northern Circars and the Ceded districts, both sheep and goats are milked by the shepherds for their own consumption, as well as for the sale of the ghi. Ghi merchants, however, say that this is not usually mixed with the rural ghi supply, as when kept it can always be detected by its smell, and that it is mainly for local and immediate consumption.

The supply of sheep and goats.—The proportionate numbers of sheep and goats in any one district depends entirely on grazing and browsing facilities. Goats are largely dependent on the foliage of trees and shrubs for their existence. Sheep, on the other hand, exist on grass and herbage and can therefore feed where there are no trees. Thus wherever it has been found necessary, in the interests of the forests, to exclude goats, the numbers have rapidly decreased and in most places a corresponding increase in the number of sheep maintained has taken place. So also is it the case that, where there are no forests and no facilities for goat browsing, sheep have

taken their place. The Dhārāpuram taluk is a striking example of this. Here, with its shallow soil and the great dependence which has to be placed on well cultivation, sheep or goats are an essential for manuring the garden lands. In this taluk there are only 3,424 acres of reserved forest, and there are no public grazing grounds, yet large numbers of sheep are kept, which are fed on the private fields of ryots, while very few goats are to be seen. Where the reserved forests are still open to goats, their numbers have rapidly increased. So much so that the Collectors of Guntūr and Kistna report that they have become, not only a serious menace to the reserved forests, into which they are allowed, but also to the ordinary grazing grounds of the district. The goat is hardier than the sheep, and breeds more rapidly and, where browsing is plentiful, requires less attention. The sheep, on the other hand, can live on pasturage and is therefore less dependent on outside grazing and, for a greater part of the year, can find grazing on harvested and fallow fields.

XII.—IMPORTS AND EXPORTS OF LIVE-STOCK INTO AND OUT OF THE PRESIDENCY.

The "Kimidi" male buffaloes seen in the Ganjām, Vizagapatam and, occasionally, in the Gōdāvari districts are all imported from Sambalpur in the Bengal Presidency.

The Nellore dealers, who trade with the Ceded districts, have one branch of their trade in small full-grown animals, collected in Hyderabad and the Central Provinces around Bhadrāchalam. These are taken through the north of the Ceded districts and are sold all along the line of route, which finishes up at Dharwar in the Bombay Presidency.

Around Kurnool some very fine buffaloes are to be seen which are imported from Hyderabad. A few bullocks are imported into Bellary district from the Bombay Presidency. These are brought to the cattle fair at Kuruvatti in the Harpanahalli taluk. This village is on the banks of the Tungabhadra river, which separates Madras from Bombay, and lies in the centre of a cattle-rearing tract; the animals are chiefly Mysore cattle, which have been bought and reared for sale at this fair. Presumably there must be a corresponding export from this fair to the Bombay Presidency.

The Mysore State exports cattle in all directions into the Madras and Bombay Presidencies. The western taluks supply South Kanara with its buffaloes, Chitaldroog supplies Bellary, both with young stock for rearing, as well as with full grown bulls. The former are coming more into favour since ryots can pay more individual attention to the animals than can the breeders, and consequently these bullocks, when reared in Bellary, are of bigger size than those imported, full grown, from Mysore. Anantapur is supplied from the fairs of North Mysore as well as from Bangalore and Kolar divisions. These divisions again supply Chittoor, North Arcot and South Arcot with their heavy draught animals, as well as the fairs of the south to which Mysore cattle are taken. West Coimbatore also to some extent receives its supply from here, but more often from the markets of South Mysore, the animals being more of the Amrhat Mahal type.

These latter come down through the Hasanur ghaut. Cheaper animals come in via Dharmapuri. The West Coast receives its supply of bandi bullocks through the various ghat roads leading down from Mysore and Coorg, though fair numbers are reared from the calves imported via Pollachi and Tudiyalur. These Mysore animals are of much the same type as those seen in Coimbatore, but are not of as good quality, and, probably, come from further west in the Mysore State.

Small cattle are, to some extent, exported to the Cochin and Travancore States, the former through the markets of Palghat and the latter from the Tinnevelly district. Both Negapatam and Tuticorin export cattle, the former to the Malay States, mostly Mysore cattle, and the latter to Colombo, which are draught cattle of the Mysore type, as well as inferior animals for the beef trade. Large numbers of fat goats and fat sheep are also exported from this latter port, many of the former coming from as far north as Hyderabad. Madras also exports a considerable number of animals to Burma for meat.

XIII.—THE CATTLE TRADE.

In the north of the Presidency there are two well-defined areas of the cattle trade. The trade within the four northern coast districts, is all in the hands of petty dealers of several castes, including Kapus, Reddis, Kalingas, Rajus, and Gollahs. These seldom deal with more than 10 pairs of good cattle, or more than 100 calves, on their return trip. Most of them also work on borrowed capital. These men trade between the markets of Chicacole taluk to as far south as Palcole and Pentapad in the Kistna district. The trading season commences in December with the paddy harvest on the deltas. Then superior cattle either buffaloes, or bullocks are brought into the northern markets for sale by ryots. These are taken southwards through the markets of Vizianagram, Kottavalasa, Thummapala, Pittāpuram, Ambajipetta, Undi, Palcole and Pentapad, animals being sold, bought and exchanged wherever there is a chance of making a profit. Young calves from Guntūr, Kistna and the Gōdāvari districts are taken back on the return journey, and are sold to ryots of the Vizagapatam district either in the markets, or by private sale. This trade in superior cattle lasts for two months and then declines and, in place of superior cattle, inferior animals, such as will be useful for wet cultivation, are brought down. This trade gradually increases until June, when the demand for plough cattle declines after the cultivation season on the deltas has actually commenced. All the time young calves are continually being imported in increasing numbers until the hot weather rains commence and grazing is available. Thus there is a continuous trade for about seven months of the year.

The shandies or markets of Sundarapuram, Chintada in Chicacole taluk and Ungarada in Palkonda taluk are principally buffalo shandies. Except for the Sambalpore or "Kimidi" buffaloes the supply is mainly local. The "Kimidi" buffaloes are all full-grown male animals and are chiefly brought to the Sundarapuram market, but also, to a lesser extent, to the Chintada market. The local

animals, which are brought, are of all ages; young stock, brought for sale to those who rear cattle; full-grown buffalo bullocks for the southern markets and also aged animals, either for sale to local ryots, or for sale to the butchers and the skin merchants. Vizianagram is, as far as buffaloes are concerned, much more of a dealers' market, but large numbers of very fine bullocks are brought in by ryots. The buyers are either dealers trading southwards or delta ryots from Gōdāvari and Kistna who have come up to buy. This latter practice seems to be on the increase, partly because there is a better selection of bullocks to choose from, and partly because the prices are much lower than at Pithāpuram and the southern markets. Considerable numbers of half-grown animals of good quality were to be seen in the Vizagapatam markets which were presumably brought in by poorer ryots, who were hard-pressed for money, since none of this class of stock leave the district until thoroughly broken in and trained. The markets south of Vizianagram to Pithāpuram are very similar to that held at Vizianagram, though, except the last, all are on a smaller scale. Pittāpuram, being on the edge of the delta, is a very big market and for wet land cattle is probably the biggest in these northern districts. The markets in South Gōdāvari and North Kistna consist of the remnants which are left over from the northern markets as well as what might be termed second-hand bullocks, i.e., middle aged animals brought in by local ryots for sale or exchange. A few of the Lambadi cattle from the Gōdāvari Agency are sometimes brought for sale to some of these markets, as well as cattle from the Kistna dry taluks.

Except for the buffalo trade and a certain amount of trade, carried on by petty dealers with cattle from the Yerramalais in the Kurnool district, the whole of the cattle trade of Nellore, Guntūr and the Ceded districts is in the hands of the cattle dealers of the Nellore district. The Nellore cattle dealers, who are all Reddis, have several branches of their trade with several different kinds of stock, but the system of trading is the same throughout. Cattle are all sold on a three instalment system and payments are not complete until the third year, the ryot giving a promissory note for the amount of the purchase price. It is impossible to form any estimate of the amount of money put into the business, but there is no doubt that it is very large, running into several lakhs of rupees. A large amount of private capital is put into this, while the rest is borrowed from the banks. The cattle dealer is really the man who provides the capital, which he supplies at interest to the 'sirdar' or the headman of a drove of cattle, besides taking a share in the profits. Under the 'sirdar,' drovers are employed in sufficient numbers to look after the herd. The sirdar and the men under him are all paid each a fixed sum for the trip, in addition to their meals, besides which the sirdar always has, and the men, according to their experience, may have a share in the profits. These men with their advance go to the exporting tract and travel from village to village purchasing their herd, which, when purchased, are taken to the importing tract. Here the cattle are hawked from village to village halting at well-known centres where they are sold. A trip to the Ceded districts is usually reckoned as six months. Separate men are sent round to these villages to collect money due, and it is seldom that the whole purchase price is not paid within the allotted time. If this is exceeded, then interest is charged.

The accounts for the trip are only settled at the end of three years when the profits are shared. The several branches of the trade are as follows:—

(1) The Bhadrāchalam trade, i.e., the importation of wet land cattle to the Pennar delta from the Bhadrāchalam taluk. These are forest bred cattle, reared by the Sugalies and are untrained when brought down. (2) The East Coast export trade, i.e., the purchase of yearling bull calves in Nellore, Guntūr and Kistna districts which are taken to the Ceded districts for sale to the black soil ryots. The cattle of South Nellore go through the Kurnool pass into Cuddapah, while those of North Nellore, Guntūr and Kistna go through into Kurnool and travel the northern part of the Ceded districts as far west as Adōni. (3) "The Bangalore trade," i.e., the import of young, as well as full-grown, working bullocks into the Ceded districts chiefly into Anantapur and Bellary. (4) The importation, from the Central Provinces and Hyderabad, of small full-grown bulls into the north of the Ceded districts and beyond as far as Dharwar into the Bombay Presidency. These are unbroken forest bred cattle somewhat of the same type as those imported *via* Bhadrāchalam. Smaller dealers confine themselves only to one branch of the trade, but bigger dealers vary their operations according to the expected demand which varies with the seasons. The trade is very well organized and dealers from different places in Nellore district have different routes, as well as different areas, in which to collect and sell their animals. Thus men of South Nellore collect chiefly in South Nellore and take their animals through into Cuddapah; while dealers of Kavali buy north of there and take their animals through into Kurnool. The Ceded districts trade being almost entirely in the hands of Nellore dealers, cattle fairs and markets are practically non-existent, except on the borders of Mysore and Bombay. Besides this trade in male stock, there is a considerable trade in milch cattle, both cows and she-buffaloes. The trade from Guntūr and Nellore is entirely in the hands of some half dozen Nellore dealers. These men have their petty agents, who travel from village to village, selecting milch cattle for purchase, settling prices and giving small advances. When a sufficient number have been selected, the dealer inspects the same and, if suitable, pays the purchase price and takes the animals to Madras in herds of 50 to 75, consisting of both cows and she-buffaloes. If grazing is plentiful the animals are taken by road, if not, they are sent by rail and are kept outside Madras for some days, until they have recovered from their journey and have become accustomed to the change of diet. Dealers come out from Madras to see the milking capacity of the animals and stop with the herd for two or three days, as they proceed slowly to Madras. They then bargain with the Nellore dealers for so much a head, giving a rupee advance on the whole herd. When the herd reaches Madras, a further advance is paid to the Nellore dealer and from that time the animals change hands and the Madras dealer commences to sell sometimes for cash, but usually for credit. The latter is a great burden on the retail milkman who has to repay the purchase price in fortnightly or monthly instalments and has to give a promissory note for from 25 to 100 per cent over the settled purchase price. At the same time he has to supply the dealer, along with his relations and friends,

with meals, etc., until the amount is paid. If he fails to pay, or fails to entertain, he is sued for the total amount of the promissory note. Thus the milkman is always in debt to the dealer and, when his cows run dry, he is forced, owing to lack of room, to sell to the butcher; and, in order to get fresh animals from the dealer, to repay the balance of his debt. One can understand from this what a temptation there is for the Madras milkman to adulterate his milk and dairy produce, and to neglect the calves. This trade supplies the major portion of the Madras City supply. The figures for the annual imports by rail (kindly supplied by Madras and Southern Mahratta Railway Company) from stations in the Ongole taluk alone amount on an average (for the last three years) to 1,344 cows and 875 buffaloes, or a total of 2,219. That the trade is increasing is shown by the figures for the last six years for Surareddipalaiyam station, the only station where figures are available for this period. These are as follows:—

——	1906.	1907.	1908.	1909.	1910.	1911.
Cows ...	44	57	108	211	86	247
Buffaloes ...	3	4	79	165	58	160

Besides this East Coast trade, there is a considerable trade in she-buffaloes from the Ceded districts to Madras, carried on by dealers from Arkonam and Conjeeveram. It is estimated that 500 she-buffaloes are annually exported from the Cuddapah taluk alone, while similarly extensive purchases are made in the Proddatur, Jammalamadugu and Pulivendla taluks as well as in the black-soil taluks of Kurnool.

It may be estimated that the imports of milch cattle into Madras are not less than 5,000 annually, the bulk of which are sold to butchers, when dry, while the calves mostly die of starvation. Thus the progency of the best milking stock of the Presidency are lost to the country.

Besides this trade in she-buffaloes from the Ceded districts, there is a considerable trade in he-buffaloes, which are taken to wet villages in the Ceded districts and are also taken to Nellore and Chingleput districts for wet cultivation.

The cattle trade in the southern half of the Presidency is essentially different from that of the Ceded districts. Here cattle fairs and weekly cattle markets are common and, as a consequence, the trade is much more in the hands of petty dealers. The biggest traders in cattle are the Janappa Chetties of North Arcot and Salem and it is these men who bring down the best Mysore and Alambadi cattle from the rearing tracts of North Salem and Mysore. These men seldom work with a capital of more than Rs. 6,000—7,000, but, when they have established confidence with the ryots of the rearing villages, they often purchase their animals on credit, giving only small advances and paying the balance after having sold their animals when they have returned from their trip. Thus they are able to deal with a large number of cattle on a small capital. There are also

a few rich Vellala dealers at McDonold's Choultry in Salem district who work with a much bigger capital and are able to get the very pick of the trade. Muhammadan dealers also trade largely in this class of stock, but work usually on a much smaller scale than the Janappa Chetties, and usually deal in an inferior class of stock. Muhammadan dealers are common throughout the southern districts. The Telugu Chetties of Pollachi and Palghat taluks and the Maduvandies of Coimbatore district are also important castes of cattle dealers. These men are to be found at all the weekly cattle markets south and west of Coimbatore. They have in their hands the bulk of the calf trade to the West Coast, as well as a good share of the imports of Mysore cattle into West Coimbatore, while they carry on any other cattle trade, which comes into their hands, e.g., considerable numbers of middle-aged Kangayam bullocks were seen at the Pollachi weekly market, which had been re-imported into the Coimbatore district from the Kazhugumalai fair in Tinnevelly district. The black-soil ryot of the south often sells his animals when middle aged and buys fresh ones. These are said to make excellent mhot bullocks when again taken to the Coimbatore district.

The annual fairs of Tiruvannamalai, South Arcot, Trichinopoly, Madura and Tinnevelly are mainly for full-grown cattle. Mysores and Salems are the chief attraction, though considerable numbers of local or aged cattle are also brought for sale or exchange. A considerable number of Kangayams also are taken to Kazhugumalai. The Janappa Chetties who deal in Mysores or Alambadi cattle usually make four to five trips in the season and, while away on one trip their relations and agents are collecting animals for the next. The trading season commences in December at the Tiruvannamalai fair in North Arcot, held at the time of the Karthikai festival, and unsold animals are taken from here to Samayavaram near Trichinopoly for the Ekadasi festival held in the end of December or early in January. The second trip commences at the Krithigai festival at Mailam in South Arcot at the end of January and cattle, unsold here, are taken to the Kazhugumalai fair in Tinnevelly. The third trip commences at the fair held at Melaiyanur (South Arcot district) in February or early March and unsold animals are taken to the Masi Maham festival at Kumbakonam or the Masi Maham festival at Tiruchendur. The fourth trip commences at the Panguni Uttaram festivals either at Mailam (South Arcot) or Palni in Madura district and unsold animals from these two are taken to the Chitrai festival at Madura, while the remnants of this and other trips drift down to the several fairs in Tinnevelly, viz., Kazhugumalai Panguni Uttaram festival, Sivalaperi Chitrai festival, and finally the Sankarnayinarkovil Audi Thapasu festival. The last trip commences and ends with the Adi Krithigai festival at Mailam in July. Besides attending these fairs, the Janappa Chetties also have to attend the annual fairs of North Salem and North West Coimbatore, viz., Mahadeswaramalai, Gettisamudram, Adamanakotta, Nattapatti, Mecheri and Nangavalli where they principally deal in forest bred calves, which they buy and take to the rearing tracts for sale.

The annual fairs of the Coimbatore district, viz., Avanashi, Karavalur and Tiruppur, are much more fairs for locally bred than for imported cattle though these latter are also fairly represented

These are mainly selling markets for the breeding tracts of the district, to which ryots from other parts come to buy.

The weekly cattle markets of the south are very numerous and, as a rule, well attended. Cattle dealing at these is conducted on a much smaller scale than at the annual fairs, but in the same way there are regular trade routes. In the Coimbatore district, Puliyampatti is the starting market for the west of the district and is also the chief market for Mysore and Alambadi cattle, which are brought down the Hasanur ghat. It is also the cheapest market in the district. Here the trade routes branch, one going to Perundurai, and the other through Annur to Tudiyalur and on from there to Pollachi. The markets of Dharapuram and Karur taluks centre at Uppidamangalam, where the trade routes separate, one going through Nainamalai (Namakkal taluk) and Turaiyur (Musiri taluk) to Ariyalur and the other going to Manapparai, Kanniseri and Dindigul. Some animals from the south of Dharāpuram go directly into Madura district to the markets leading to Dindigul. The trade is chiefly in the hands of Telugu Chetties, Maduvandies and Muhammadans.

Palmaner is the first market below the plateau for the more eastern districts and as in the case of Puliyampatti, it is a cheap market. This is fed from Mysore and Punganur; here cattle are brought by dealers and taken to Gudiyattam and on to Ranipet. Gudiyattam is again fed from the Kangundi zamindari, from Mysore and Tiruppattur. Ranipet market, besides the Gudiyattam cattle, is supplied to some extent from the north. Pullampet taluk of Cuddapah supplies local cattle, as well as a few of the Nellore type: some Nellores also come from the Kalahasti zamindari. At Ranipet the route divides, some animals going to Conjeeveram and Walajabad and others to the markets of South Arcot. The trade is in the hands of all castes and kinds of dealers. The Janappa Chetties and Muhammadans of Gudiyattam predominate, but, besides these, Mysore Muhammadans and Telugu Chetties are important castes of dealers.

XIV.—THE MEAT TRADE AND THE SLAUGHTER OF LIVE-STOCK FOR FOOD, ETC.

Cattle and buffaloes.—Although the bulk of the population are nominally vegetarians, a large proportion of them are only so from necessity and have no religious objections to eating flesh of one sort or another: and the further the people are removed from Hinduism the less objection have they to eating the flesh of cattle.

The hill tribes of the northern districts eat large quantities of beef, which is evidenced by the large quantity of green bones brought to the shandies of Vizagapatam district. Muhammadans throughout the Presidency have no objection to eating beef and in many places cattle are regularly slaughtered by them for food. It is stated, in the northern coast district, that even nominal Hindus are more and more taking to eating the flesh of cattle and buffaloes, since this is much cheaper than the flesh of goats. Apart, therefore, from the demand of large towns and cantonments a considerable amount of beef is eaten by the people of the country.

As would be expected in a country, while cattle are the sole draught power and, where there are, among the bulk of the population, strong

religious objections against the slaughter of cattle, the beef trade depends very largely on animals which are, or have become useless for draught or breeding; and, if the question is regarded without bias, it is clear that this is an excellent thing for the cattle of the country. By the removal of all useless and worn-out cattle, a serious menace to outbreaks of cattle disease is removed; for, if such animals are not destroyed, they are usually allowed to slowly starve to death and, in their weakly condition, are very much more prone to contract contagious diseases. Not only this, but the removal of such animals leaves more room and more grazing for useful animals. In the Tinnevelly district, since the export trade in beef cattle from Tuticorin has developed, a great improvement is now noticeable among the village cattle. Useless, worn-out and half-starved cattle are now very seldom seen, as ryots dispose of animals, which are no longer useful, to the export trader. The Colombo beef trade removes large numbers of useless cattle and there is also a certain amount of trade in beef to the Malay States. This is chiefly dried beef, which is prepared in some of the tanneries of North Arcot and Chingleput. In northern coast districts, there is a complaint that animals are occasionally slaughtered, which still have a year or two's work left in them; and that this is possible is shown by the following figures given by a Mala in Vizagapatam of the estimated profit, which he expected from the slaughter of a pair of buffaloes, purchased in the weekly market for Rs. 35 :—

	RS.	A.	P.		RS.	A.	P.
Two skins	16	0	0	to	20	0	0
Fat 3–4 maunds (local) at Rs. 5 a maund	15	0	0	to	20	0	0
Horns ½ maund (local) ...	2	0	0	to	2	8	0
Bones	0	4	0	to	0	8	0
Total ...	33	4	0	to	43	0	0

In addition to this the flesh would be sold as meat.

There is hardly a weekly cattle market in the Presidency, where cattle are not brought in for sale to butchers, though in many cases their slaughter must be mainly for the sake of skin and bones, since animals are little else.

Male buffaloes besides being slaughtered for the beef are also largely slaughtered as sacrifices to the village dieties.

Sheep and goats.—It may be said that all surplus live-stock of this class are slaughtered for meat. At festival times throughout the country goats are killed in very large numbers, but, apart from this, the supply of green skins, which are regularly brought for sale to cattle markets, shows to what an extent goats and, in some measure, sheep are slaughtered for food. Fattening sheep and goats for the butcher is not general and it is mainly for the export trade to Colombo that these are fattened, though, to a certain extent, also for the Bangalore, Madras and Nilgiri markets. Hindupur is perhaps the most important mutton butchers' market in the Presidency and some splendid goat wethers are brought here by dealers from the Ceded districts and from the Hyderabad State. The pick of these go

to Colombo. In all the southern weekly markets fat sheep and goat wethers are brought, singly or in pairs, for sale by petty ryots and coolies. These are all bought up for the Colombo market and fetch very good prices up to Rs. 12—14 per head.

XV.—PROFITS FROM STOCK-BREEDING.

It is impossible to form any but a very rough estimate of profits from stock-breeding, since so much of the food and time, given to the animals, has very little sale value; besides which the conditions, under which breeding and rearing are carried on, vary so much in different parts.

The Nellore breeder, who depends on his grazing lands and harvested wet lands for the greater part of the year as food for his herd, sells his male stock, when a year to 18 months old at 3 for Rs. 100. Allowing that 50 per cent of his cows calve each year and that half his young stock are bull calves, a herd of 100 cows will bring in a gross revenue of Rs. 833 from the sale of the young bulls alone. Besides this he adds to his female stock 25 per cent every year. Allowing for an annual loss of 10 per cent on his breeding herd, he still has a 15 per cent increase, which, even if valued at the same price as he gets for his yearling bulls, would bring him in Rs. 500, i.e., in all Rs. 1,333, or Rs. 13-5-4 for each cow. To maintain his herd, he must have considerable grazing areas, but, even allowing 6 acres per head for each cow with its progeny, this would probably not cost him more than Rs. 500 per annum, i.e., allowing for assessment and interest on the capital value of the land. This leaves Rs. 833 to pay for his cattle herds and to provide straw for the months when grazing is scarce. This straw he obtains from his own wet lands, and against its value can be set that of the manure produced when the herd is kept on the wet lands. Allowing Rs. 10 a month for the pay and meals of the cattle herds, and 10 per cent loss from deaths among his young stock, this still leaves a net annual income of over Rs. 600 or more than Rs. 6 per head for each cow.

The forest breeder of Kollegal and North West Salem keeps his cattle penned in the reserved forests, except at the harvest time, and pays four annas a head for the year's grazing, besides a small fee for a penning license. His cattle are subject to great variations both in climate and in the supply of food and water and do not, therefore, breed so regularly as better fed "plains" cattle. It may be reckoned therefore that his herd does not drop more than 40 calves per annum to every 100 cows. Thus 100 cows on the same basis will give 20 bull calves, which sell when 9 months to a year old at from 3 to 10 for Rs. 100; about 5 for Rs. 100 being taken as an average. The number of male calves will probably exceed the number of female calves, owing to the poor condition of the cows in the hot weather—in fact breeders say that they do—but this need not be considered here. Thus 20 bull calves in a good season should bring in a gross revenue of Rs. 400. The value of the female calves need not be considered, since these will just about maintain the strength of the herd, when allowance is made for deaths from disease, starvation, wild beasts and old age. Out of his revenue he has to meet grazing fees and the cost of his herdsmen, the latter being, usually, the cost of their food and clothing. This should not amount to more than Rs. 100 in all.

Deducting 10 per cent of the gross revenue for mortality among his male calves this leaves a net annual income of Rs. 260 for every 100 cows or about Rs. 2–10–0 per head of his breeding herd.

The Kangayan breeder is fortunate in having a class of animal which is so popular; and the profits of cattle breeding and rearing—for the two go hand in hand here—are much greater than in either of the preceding cases. Much greater value is here placed on the "life" of a young animal, i.e., its value from parentage and breeding. Cows also usually calve, in this tract, every year, since whether in milk or in calf, they receive proper treatment throughout. If a cow calves every year, her progeny when four years old will have an average value of Rs. 125, i.e., Rs. 200 per head for bullocks, and Rs. 50 for heifers, and this, excluding the value of the manure produced, can be taken as the gross annual revenue. Against this there is the following expenditure for the four years:—

	RS.	A.	P.
Grazing for 6 months in the year at 2 acres per head ($2\frac{1}{2}$ acres are taken as the area required for a full-grown animal) = 8 acres of grazing land, at Rs. 1–4–0 per acre (12 annas assessment and 8 annas for attendance and interest on the capital value of the land)	40	0	0
Straw, gruel and attendance for the remaining 6 months at Rs. 2 per mensem for 4 years	48	0	0
Depreciation in value of the cow and death of young stock at 10 per cent of the gross income	12	8	0
	100	8	0

This leaves a net profit of Rs. 24–8–0 per annum on the progeny of a single cow. The manure from these animals, which is required for garden cultivation, has also a very considerable value; for on it, the ryot has to depend for his heavy crop yields, which are essential, if garden cultivation is to pay.

In the Ongole tract it is impossible to form any estimate of the profits of cattle breeding, since so much of the cost of feeding is dependent on spare time employed in collecting fodder and grass, with which the young stock are stall-fed; but the profits must be very considerable, since even female stock, which for their age are much less valuable than male stock, are very largely reared, and quite good animals, which have been reared most carefully, can be purchased for Rs. 70 to Rs. 80 when from three to four years old.

XVI.—DAIRYING.

The existing conditions of the milk supply, as far as the retail trade is concerned, are very unsatisfactory, and it is seldom that pure cow's milk can be obtained, unless the milkman brings his cows to the house and the milking and measuring are carefully supervised. Under the joint family system of living, people of the middle and upper classes, who require milk for their every-day use, usually keep

their own cow, or make arrangements with villagers for the hire or loan of a cow, while it is in milk. This is really the most economical method for joint households, and the cost of the animal's keep is hardly felt, since most of the concentrated food is made available in the process of preparing food in the house, such as rice bran, rice water and plantain leaves, with the remnants of the household meals.

It is difficult to see how any improvement is to be expected as long as no milking breed is allowed to survive. In several of the large towns one finds dairies, but these are mainly for the supply of butter for the European community and it is only where the cream separator is used and where it is possible to dispose of the separated milk at remunerative rates that this trade can survive. In towns, however, there is usually a market for separated milk for the manufacture of curds. At these dairies, also, buffaloes' milk is largely used, since this, being so rich in butter fat, yields much more cream, and consequently more butter, than cows' milk. For the same reason she-buffaloes are kept in country districts for the manufacture of ghi and also for the reason that buffaloes are not such expensive animals to feed.

The ghi industry has altered very much within recent years, since rapid means of transit have been developed. Formerly the demand was much more of a local one and was more or less limited; thus there was a competition in the supply and the ghi was good. Now the whole of India, as well as Burma, forms the market, with the consequence that every corner of the country is now exploited by merchants for the supply of ghi. The result is that, at every change of hand from the producer to the consumer, the ghi is liable to be adulterated. Even if the producer does not adulterate the ghi, usually not so much care is taken in its preparation. Moisture is often left in it, which, when the ghi is kept, gives it a bad smell. In the Ceded districts, kusuma or safflower oil is largely used for adulterating ghi. In some cases this is done even by the ryot before it is sold to the petty dealer. The petty dealer, it is usually stated, makes six tins (kerosine tins) out of four of the ghi which he collects. This is done by adding safflower oil or animal fat, which latter is obtained from the Malas, who melt it down from the carcases of dead animals. It is stated that at each change of hands four tins of ghi are made into six tins and, if this is so, there is no wonder that complaints all over the Presidency are loud when the question of the purity of the ghi supply is mentioned. Every district reports the same complaint—that ghi is not only very much adulterated but that it has risen greatly in price. Not only in the Ceded districts, but everywhere in the Presidency is the fat of dead animals used for the adulteration of commercial ghi. The General Traffic Manager of the South Indian Railway has kindly had enquiries made throughout that railway system and states that animal fat is occasionally booked in small quantities almost throughout the system and that one of its uses it said to be for adulterating ghi, though it is also used for dressing hides, for axle grease and for the manufacture of soap and candles. Its price varies in different parts from As. 2—10 to As. 5 a pound. As the demand for milk increases, ghi is bound to be more and more adulterated. In a memorandum published by the Government of India in 1884 on the subject of ghi, Mr. Robertson, the then Agricultural

Reporter to the Government of Madras, showed that the quantity of milk (cows) required to make one viss of ghi (3 lb., 2 oz.) would, if sold as fresh milk at 2½ annas a quart, be worth Rs. 7–8–0 while, if made into butter, it would yield Rs. 5–13–0 worth of butter, besides buttermilk, and even now, when complaints are everywhere made of the high price of ghi, this seldom sells at more than Rs. 2–8–0 a viss.

In the ghi-producing districts, good ghi can still be obtained in large quantities, but, under existing trade conditions, this is seldom allowed to reach the large markets, nor is this surprising, since the price of good and bad ghi is very much the same. The adulteration of ghi may, however, be taken as essential, if the supply is to meet the demand and it would be much better, if everyone concerned realized this ; for then it would be possible for Co-operative societies and other similar bodies to provide a ghi mixture, consisting of pure ghi and wholesome vegetable oils, instead of the present haphazard methods and filthy ingredients used for its adulteration.

XVII.—WHERE ASSISTANCE IS, OR MIGHT BE, GIVEN BY GOVERNMENT, FOR THE IMPROVEMENT OF CATTLE AND THE MAINTENANCE OF SUPPLY.

(*a*) *Reservation of Forests.*—There is no doubt that the reservation of lands for forests has already done much to prevent large areas of land, which are unsuitable for cultivation, from becoming barren wastes, by checking unlimited grazing ; and has, in consequence, been the means of greatly adding to both the quantity and quality of grazing. A more rigid limit to the present numbers of cattle, which are allowed in the forests, is necessary, however, both in the interests of the cattle of the country and of the forests ; and no reserve should be allowed to be overstocked. As has been before stated, people, who live near the forests, usually keep far more cattle than they have fodder for, and, when grazing is scarce, these animals are allowed to starve. The result is, that cows very seldom calve and the young stock never get a chance to grow, but remain puny, stunted animals, of little use or value to any one. If the number of cattle were limited, the animals would be better fed, would breed more regularly and would produce better calves, which would be of some use to the country. Overstocking, again, reduces the quantity and quality of the grass. This is especially the case on steep hill-sides. In the Salem forests near Pennagaram, on many of the hill-sides, regular terraces of loose stones have been formed by cattle. If the forest canopy is thin, which it usually is on exposed slopes, these are bound to be badly scoured after heavy rain, and this is bound to seriously affect the forest growth, with the ultimate result that both forest and grass disappear.

The formation of grazing reserves for cattle, sent away for grazing from intensely cultivated tracts, especially delta tracts, is a matter, which deserves serious consideration. Good and ample grazing should be provided for these cattle which, when they arrive, are usually in miserable condition, having been kept in the villages until the last possible moment. The bulk of these are the breeding stock of these tracts, on which great dependence has to be placed for the maintenance of the supply of plough bullocks. It would be a serious

matter, if the delta tracts were depleted of their breeding stock, for poor as the quality of these animals is, it would be a great strain on other districts to supply the demand, if once the breeding stock of the deltas disappeared.

More adequate arrangements for watering cattle in the forests are also necessary, both from a humane point of view, for the cattle at times suffer severely from lack of these, and from the point of view of the owners of the cattle, who are often tempted to trespass on other reserves in order to water their cattle.

(b) *Private grazing grounds.*—These are most important for the agricultural development of the country ; for it is only with regulated grazing that any real improvement of cattle can be effected. This should receive every encouragement.

(c) *Cattle shows and exhibitions.**—More money, in the past, has been spent by Government on these, than on any other method of improving the cattle of the country, and there is very little to show for it. The Board of Revenue has recently circulated enquiries to all Collectors of districts, where shows are, or have been held asking them to report on the utility, or otherwise, of these. These reports have been made available in preparing the following note on the subject :—

(1) Various kinds of cattle shows have, of recent years, been held in this Presidency, but the general opinion on these is, that, unless the show is held in a recognized breeding tract, it serves no practical use ; and very few of these have ever been held in such tracts.

(2) Cattle shows in connection with recognized cattle fairs were suggested by the Agricultural Committee in 1888 as an alternative to the cattle side of agricultural exhibitions, which, it was even then recognized, did not bring in any useful results. But the fact that very few of these fairs are held in breeding tracts, seems to have been overlooked, and several shows have since been started at fairs, where practically nothing but bullocks are brought; either imported bullocks brought from a distance by regular cattle dealers, or local or used bullocks brought in by ryots for sale or exchange. This fact explains their failure. There are practically no classes except for bullocks. Every animal brought to these fairs is for sale, and the owner or dealer wishes to sell to the best advantage. If his best animals are shroffed out into the show ring, not only may he lose a chance of disposing of the animal, but it takes away from the remaining number the appearance of quality, which the best animals give to his herd. It must be remembered that these are all working bullocks and not breeding stock, and it is natural that the buyer wishes to pay as low a price as he can for his animals. He will, therefore, naturally look outside the show ring for them. If looked upon in this light, the sympathy of any one would naturally be with the cattle dealer in not wishing to show his animals in the show ring. Nor is it clear what benefit will be done to cattle breeding by giving prizes to imported or middle aged bullocks, which are of no use for breeding. The Tiruppur cattle show is the only one held in connection with a cattle fair, which is held in a breeding tract. Here there are breeders, who breed cattle on a large scale, and who do bring in their animals for show purposes; and, it is

* See Appendix E, pages 58—60, Proceedings of the Board of Agriculture, 1910.

understood, that there is considerable rivalry among them for the prizes. The Collector reports, that within the last ten years much more care has been taken in the selection of breeding bulls, but cannot estimate to what extent this is due to the show. These large breeders are, however, well known to ryots and it is quite a common thing for black soil ryots from Tinnevelly, Madura, Ramnad and the south, to come up to the Kangayam tract to buy bullocks, which for black cotton soil work and heavy draught work, are much preferred to those from Salem, North Coimbatore and Mysore. These ryots are prepared to pay very high prices for good animals, and this is probably sufficient incentive to these breeders to do their utmost to improve and maintain the local breed, though of recent years a great mistake has been made in importing foreign blood, chiefly Ongole, into the herds, with the result that the animals are slower in movement, and lack the sound, hard feet and hardy constitution of the Kangayam. The cattle show in this connection might be of great value in helping to maintain the true type of the Kangayam cattle.

(3) Cattle shows in connection with the Agricultural Exhibitions have never proved a success. The only exception (and even this seems to have been only nominal) on record is the case of the Nellore Exhibition in 1869. This success, however, seems to have been solely due to the visit of His Excellency the Governor to the Exhibition, and the consequent interest, taken in it in that year by local rajas and zamindars. Since the abandonment of the Nellore Exhibition, there are no records to show that an exhibition has ever been held in a cattle-breeding tract. It is stated by some that these exhibitions have an educative effect, but, as far as the live-stock side of the exhibition goes, it is not at all clear what these can teach. It is not as if the ryots of the locality were interested, or engaged in cattle-breeding. It is quite new to them, and as the Secretary of the Vizagapatam Agricultural Association says "it is like watering the tree at the top alone." That this opinion is held by many, is clear from the number of people who recommend in place of cattle shows, the establishment of cattle-breeding farms and the supply of breeding bulls.

(4) Cattle shows pure and simple. The Ongole cattle show is the only one which is held in a breeding tract and, to all appearance, is a distinct success; but on closer enquiry into the cattle-breeding of the tract, there are grave doubts as to the soundness of the present system of working the show. The most important cattle-breeding villages in the taluk have been visited. The principal villagers state that there is a deterioration of their cattle due to two causes :—(i) The increase in the export of heifers in calf from the tract. (ii) The loss of bone in the animals due to diminution of grazing grounds, and to the increase in stall feeding. In these parts ryots set apart a certain portion of their patta lands for grazing. This is nominally about one-sixth of each holding, but on rich soils this is actually very much less, since these grazing lands are now chiefly in places which are unfit for arable farming, the land being uneven and much cut up by the rains. When this tract was visited, only the best cattle were to be seen, as the others had been sent away for grazing to the hills, but it was very noticeable how few breeding cows were in evidence. Of the young animals in the village, i.e., young bulls and heifers, a

considerable proportion of them had been purchased to feed up for sale, either from villages in the neighbourhood, or, in many cases, from all parts of the Guntūr district and the Kandukur taluk of the Nellore district. This feeding up of cattle for sale has become a regular profession, which has greatly developed within the last few years. Poor men take a loan of money from the sowcar, with which they scour the country to purchase a likely looking animal, usually a heifer, to feed up. When these are ready to calve, they are sold to dealers, who take them down to Madras. The difference between the purchase and sale price is divided, according to pre-arrangement, between the sowcar and the man to whom he gave the loan. In the same way these men feed up for the Ongole show, but, in this instance, they get the best animals they can procure, since animals at the show command a higher price than the ordinary market price. Prizewinners of the previous year often change hands at very high prices, to be fattened up for the next show on the off chance of obtaining, either a prize or an enhanced price, and, as far as raising breeding stock and improving the breed of the cattle, it cannot be said that the show, as at present constituted, is a success. The pick of the animals of the district are collected, fattened up, and sold out of the district. They are forced to early maturity by liberal hand-feeding from almost the time of their birth. They are stall-fed and seldom get any exercise, as the length and shape of the hoofs too often show. When they are in calf they are over-fed and naturally the calf suffers, being small and puny. Many of these heifers, especially the best ones, were fattened up, as if for a fat stock show, and large numbers are sold for dairy purposes, usually to people and places where stock rearing is not understood and where little or no value is placed on the calf. The consequence is that these latter are under-fed, ill-cared-for, and usually die. This gives rise to the common belief that the Ongole cattle rapidly deteriorate when taken away from their native place. Of all the heifers which were seen in these breeding villages, only in one case did the owner wish to keep the animal for breeding purposes. The rest were all for sale. In the selection of sires, there is certainly much care taken to get cows covered by a good bull, but no effort is made, other than the *mamul* method of dedicating a Brahmani bull, to provide sufficient bulls, to serve the district. There are certainly large numbers of Brahmani bulls, but the numbers of the good bulls is limited. The Karumanchi village bull serves cows brought from a radius of twenty miles around and, for four months in the year, is said to serve two to three cows a day, but he is an old animal and no steps are taken to replace him when he dies. At Guruvareddipalem there were some excellent young stock by a bull which died last year. There are two other bulls in the village, but inferior to the one that died. Nothing has, however, been done to replace him.

(5) The selection of a Brahmani bull, which in these parts is only done on the occasion of the death of some important man in the village by his relations, must now be a very much more difficult matter than formerly. Even the richest men in these villages do not own more than ten to twelve head of stock including their working bullocks; while formerly herds owned by one man of fifty to hundred animals, were common. Thus the selection from his own stock is very limited, while

specially good young bulls belonging to others have a fictitiously high value placed on them, as probable winners of valuable prizes at the Ongole show. For example, one very fine young yearling bull at Guruvareddipalem was valued at Rs. 200, and the owner would probably not have parted with it for less than Rs. 180. It is not many dry land cultivators, who only work two or three ploughs, who would pay such prices and it is probable, since there are so many inferior Brahmani bulls that the selection is either an inferior animal, or a very young calf, whose masculine characters have not yet developed. Thus, at present, it seems that the object of the show is not altogether attained. The spirit of competition has, undoubtedly, been roused and the high prices paid for animals has led to great care—too great care in fact—being taken of the young breeding stock, but it has led to the export of the best female breeding stock from the breeding tract. In the case of bulls, this would not be a serious matter, since one bull will serve for a number of cows, but it is a serious matter in the case of female breeding stock. The following suggestions therefore are made :—That the classes for female stock be thoroughly revised, that there should be no class for heifers except for those in milk teeth only. That the classes for cows, which have a full mouth, be developed and more substantial prizes given for these. This means that at least one and, possibly, two or three calves from the best cows would be kept in the district. To improve the male breeding stock, it is suggested that a prize be given to the village, which wins the greatest number of prizes. The prize money will be held in reserve by the Show Committee as a reserve fund, for replacing or supplying good breeding bulls when required. Much more might be made of the Brahmani bull class and some recognition might be taken of the head of the family, which dedicates good Brahmani bulls. At present the Government give a medal to the best bull in the show, which, more often than not, is given to an animal which is not a Brahmani bull. Since all breeding bulls in the district are Brahmani bulls and these are all dedicated when young, such medals usually go to animals, which are intended to be made into bullocks. Special attention when judging should also be paid to the feet of the animals, as it is noticed that these cattle often suffer from too close confinement and from lack of exercise, when being reared; and, that breeding stock, which are over fattened, should lose marks in consequence when being judged. At the cattle show held this year, an attempt was made to start classes for breeders' cattle as apart from the cattle shown by the professional rearer. This deserves every encouragement, but it requires very careful organization. Entries should be sent in sometime before the show, so that enquiry can be made as to the previous ownership of the animals, and the conditions for showing should be made widely known. The prizes should also be very substantial, otherwise in the first instance, breeders may not take the trouble to show animals. It is quite possible that, if successful, this may in time develope a system of registering the service of cows by Brahmani bulls and of the raising up of a strain of pedigree cattle.

(*d*) *The supply of breeding bulls.*—(1) In the early eighties, several breeding bulls of the Aden strain, bred at Saidapet, were distributed by Government, but with little success; and these were either sold or withdrawn. Of recent years, Government have bought

bulls at shows and fairs which have been distributed to different districts; as previously mentioned, there are only seventeen of these on the rolls. Until the last year or two, no record was maintained of the services made by these bulls, or of the results, nor were proper arrangements made for their upkeep. This has, however, now been rectified and some data, as to how far the services of these animals are utilized, will soon be available. This method of selection leaves very much to be desired. Nothing is known of the animal's pedigree, of its constitution and other inherent qualities, so necessary in a breeding bull, and it is certain that very much better and more rapid results would be obtained if these were known. Then again different breeds are required for different tracts. It is of little use sending an Ongole bull to Tinnevelly or Tanjore, where he would be much too big and heavy to serve the small cows of those districts, besides producing a type of animal which would be of little use for the agricultural requirements of those tracts.

(2) The development and extension of the Kangayam breeding tracts is of most pressing importance at the present time.* The demand for bullocks of this breed is greater than the supply and prices are high. It is only the big breeders who own their own breeding bulls, which are often kept for their exclusive use. There is already a considerable amount of cattle rearing carried on in this tract, which could be converted into cattle breeding. The existing agricultural conditions demand that the ryot should keep cattle more than are actually required for cultivation, and there is no reason why these should not be good breeding cattle. Hence, the supply of breeding bulls would probably be a great incentive to petty breeding, which would not only assist the breeding tract, but would also help to supply the markets of the south with good bullocks. A Government breeding farm seems to be the best way of supplying the necessary breeding bulls, since the breeding would be absolutely under control and only those animals, which fulfilled the necessary requirements of a breeding bull, would be distributed. Bulls in the first instance would be distributed in the existing breeding tract, and as time went on, this could be extended to the adjoining taluks, where very similar agricultural conditions prevail. Such a farm would be a costly experiment, but in the long run, it would be much more effective and probably cheaper than the present haphazard method of supplying and distributing bulls. On the success of this would rest similar developments in other parts of the Presidency, where cattle breeding needs encouragement, either now or in the future. The details of such a breeding farm need much more careful local enquiry than has been possible, during the time available for this general cattle survey; and much also might be learned from the experience of other Provinces, where Local Governments have already taken action in this direction.

(3) In other parts of the country, encouragement should be given to landed proprietors to supply good breeding bulls for the use of their tenants; as well as to others disposed to dedicate good Brahmani bulls, and every assistance possible might be given in the purchase and selection of likely animals.

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* See paragraph 9, Appendix E, page 61, Proceedings of the Board of Agriculture, 1910.

(*e*) *Co-operative Credit Societies.*—There are great possibilities in the future for extending the scope of these. In the matter of the ghi supply, this seems to be especially important, as any means of bringing the producer more closely into touch with the consumer, will lessen the amount of adulteration. There seems to be no reason why villages in ghi-producing tracts should not work in co-operation with large town co-operative supply associations. Not only would the village association get better prices for its ghi, but the supply association could supply pure ghi to those who could afford to pay for it, and a mixture of ghi and pure wholesome vegetable oils to the middle classes. The great essential to success would, however, be to always have the ghi of regular quality, and this could most easily be done by using the cream separator. In villages, buffaloes are usually all milked at the same hour of the day, and the milk could be taken to and separated there and then at a central place, the freshly separated milk being returned for the manufacture of curd for domestic use. It will be possible, the Principal reports, in time for short vernacular courses in practical dairying to be arranged for at the Agricultural College at Coimbatore during the vacation time, which would be sufficient training for working small village dairies.

(*f*) *Improvement of the milk supply.*—Madras city makes the biggest drain on milch cattle of any other town in the Presidency, and the pity of this is that the majority of the Ongole cows, which are brought down here, are heifers with their first calf, i.e., animals which have not yet reached anything like their full milking capacity. If these could be bought up when dry, taken care of and served by a good dairy bull, instead of being sold, as at present, to the butcher, it would be possible to greatly check the present drain on the country for milch cows. Mr. Robertson, the late Principal of the Saidapet Agricultural College, mentions the case of a Nellore cow, purchased, as worn out, from a Madras milkman, which afterwards became one of the best milkers in the farm herd, and many thousands of equally good animals have probably been lost to the country since then; being sold as worn out cows to butchers, when really they have never reached their prime. It might be possible for the Corporation to do this on their sewage farm, or they might even start their own municipal dairy for the supply of milk, and their male stock could be utilized for town work. This would, to some extent, interfere with private enterprise, but, in this case, the health of the community is at stake, which is a much more serious consideration. If such a venture proved successful, other municipalities of the larger provincial towns might also carry on their own dairying, and with such dairies as a basis, it should in time be possible to raise up a better milking strain of cattle.

H. C. SAMPSON.

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